Go To Table Of Contents

354

-005, -011

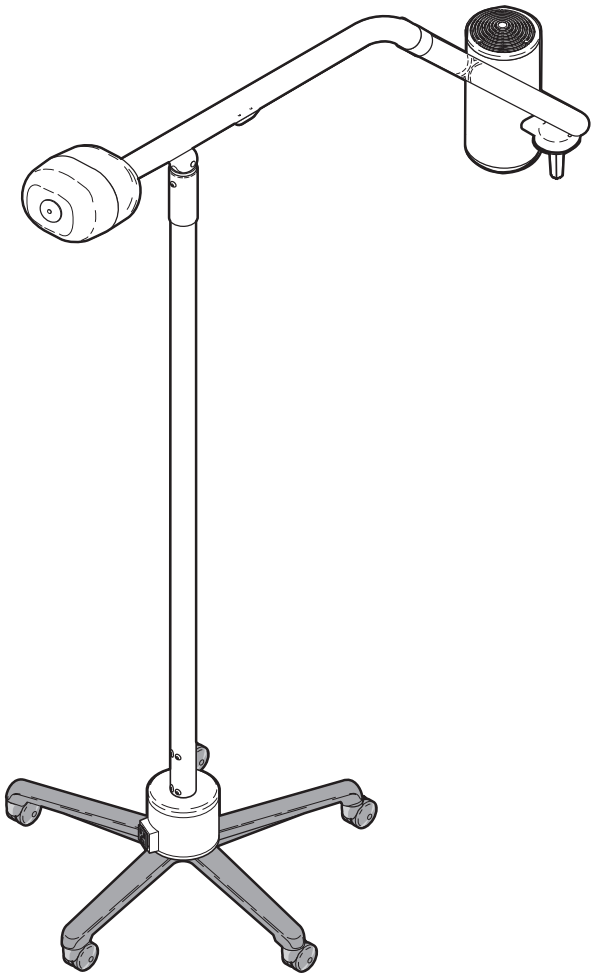
-022, -023

Ritter® by MIDMARK

Mobile Lighting System

Serial Number Prefixes:
KR, MC & MV

Service and Parts Manual



MA548800

354 MOBILE

FOR USE BY MIDMARK
TRAINED TECHNICIANS ONLY

SF-1774

Part No. 004-0311-00 Rev. C (1/01/04)

Go To Table Of Contents

TABLE OF CONTENTS

Section / Paragraph.....Page

IMPORTANT INSTRUCTIONS
General Safety Instructions.....ii
Safety Alert Symbols.....ii
Warranty Instructions ii

SECTION I GENERAL INFORMATION
1.1 Scope of Manual 1-1
1.2 How to Use Manual 1-1
1.3 Description Of 354 Mobile Lighting System..... 1-1
1.4 Specifications 1-3
1.5 Parts Replacement Ordering..... 1-4
1.6 Special Tools 1-4

SECTION II TESTING AND TROUBLESHOOTING
2.1 Operational Test (See Figure 2-1) 2-1
2.2 Troubleshooting Procedures..... 2-2

SECTION III SCHEDULED MAINTENANCE
3.1 Scheduled Maintenance 3-1

SECTION IV MAINTENANCE/SERVICE INSTRUCTIONS
4.1 Introduction..... 4-1
4.2 Fuse Removal / Installation *(Early Units)* 4-1
4.3 Fuse Removal / Installation *(Later Units)* 4-2
4.4 Cross Tube Counterbalance Assembly Removal / Installation..... 4-2
4.5 Transformer Removal / Installation 4-3
4.6 Transformer Input Tap Adjustment 4-6
4.7 AC Inlet Removal / Installation *(Later Units Only)*..... 4-7
4.8 ON / STANDBY Switch Removal / Installation..... 4-8
4.9 Lighthead Removal / Installation 4-8
4.10 Bulb Removal / Installation..... 4-9
4.11 Fan Assembly Removal / Installation..... 4-10
4.12 Bulb Socket Removal / Installation 4-12

Section / Paragraph ..... Page

4.13 Lens Removal / Installation 4-14
4.14 Iris Diaphragm Removal / Installation 4-16
4.15 Cross Tube Counterbalance Adjustment ... 4-18
4.16 Ball Pivot Joint Tension Adjustment 4-20
4.17 Ball Pivot and / or Ball Pivot Stop Removal / Installation..... 4-21
4.18 Lamp Tube Brake Adjustment..... 4-23
4.19 Lighthead Brake Adjustment..... 4-24
4.20 Lighthead Pivot Bearing Stop Removal / Installation..... 4-25
4.21 Caster Removal / Installation 4-26
4.22 Lamp Tube Pivot Stop Removal / Installation..... 4-26
4.23 Fuse Holder Removal / Installation *(Early Units Only)*..... 4-28

SECTION V SCHEMATICS AND DIAGRAMS
5.1 Electrical Schematics / Wiring Diagrams 5-1

SECTION VI PARTS LIST
6.1 Introduction 6-1
6.2 Description Of Columns..... 6-1
6.3 Torque Specifications And Important Assembly Notes..... 6-1
354 Ritter Mobile Light System..... 6-2
354 Midmark Mobile Light System..... 6-3
Base and Vertical Tube Assembly..... 6-4.*
Cross Tube Assembly) ..... 6-5.*
Lamp Tube Assembly..... 6-6
Lighthead Assembly..... 6-7.*
Bulb Carriage Assembly 6-8
Optic Assembly ..... 6-9.*

COMMENTS..... 7-1
FAX ORDER FORM..... 7-2

(*) Indicates that there has been a serial number break for the illustration and that there are additional point page(s) following the original page.

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TABLE OF CONTENTS

General Safety Instructions

Safety First: The primary concern of Midmark Corporation is that this mobile lighting system is maintained with the safety of the patient and staff in mind. To assure that services and repairs are completed safely and correctly, proceed as follows:

(1) Read this entire manual before performing any services or repairs on this lighting system.

(2) Be sure you understand the instructions contained in this manual before attempting to service or repair this lighting system.

Safety Alert Symbols

Throughout this manual are safety alert symbols that call attention to particular procedures. These items are used as follows:

DANGER

A DANGER is used for an imminently-hazardous operating procedure, practice, or condition which, if not correctly followed, will result in loss of life or serious personal injury.

WARNING

A WARNING is used for a potentially hazardous operating procedure, practice, or condition which, if not correctly followed, could result in loss of life or serious personal injury.

CAUTION

A CAUTION is used for a potentially hazardous operating procedure, practice, or condition which, if not correctly followed, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

EQUIPMENT ALERT

An EQUIPMENT ALERT is used for an imminently or potentially hazardous operating procedure, practice, or condition which, if not correctly followed, will or could result in serious, moderate, or minor damage to unit.

NOTE

A NOTE is used to amplify an operating procedure, practice or condition.

Warranty Instructions

Refer to the Midmark "Limited Warranty" printed in the Installation and Operation Manual for warranty information. Failure to follow the guidelines listed below will void the warranty and/or render the 354 Mobile Lighting System unsafe for operation.

- In the event of a malfunction, do not attempt to operate the lighting system until necessary repairs have been made.
- Do not attempt to disassemble lighting system, replace malfunctioning or damaged components, or perform adjustments unless you are a Midmark authorized service technician.
- Do not substitute parts of another manufacturer when replacing malfunctioning components. Use only Midmark replacement parts.

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SECTION I
GENERAL INFORMATION

1.1 Scope of Manual

This manual contains detailed troubleshooting, scheduled maintenance, maintenance, and service instructions for the 354 Mobile Lighting System. This manual is intended to be used by Midmark's authorized service technicians.

1.2 How to Use Manual

A. Manual Use When Performing Scheduled Maintenance.

(1) Perform inspections and services listed in Scheduled Maintenance Chart (Refer to para 3.1).

(2) If a component is discovered to be faulty or out of adjustment, replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

B. Manual Use When Mobile Light Is Malfunctioning And Cause Is Unknown.

(1) Perform an operational test on light (Refer to para 2.1).

(2) Perform troubleshooting procedures listed in Troubleshooting Guide (Refer to para 2.2).

(3) If a component is discovered to be faulty or out of adjustment, replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

C. Manual Use When Damaged Component Is Known.

(1) Replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

1.3 Description Of 354 Mobile Lighting System

A. General Description (See Figure 1-1).

The 354 Mobile Lighting System is a compact spotlight designed specifically for performing general medical examinations and procedures where maneuverability is desired.

354-005 & -022	Ritter 120 VAC, Mobile Lighting System
354-011 & -023	Midmark 120 VAC, Mobile Lighting System

The major serviceable components of the mobile lighting system are the twin roller caster (1, Figure 1-1), locking twin roller caster (2), transformer (3), AC inlet w/ fuse drawer (4) [new style units only; older units have hardwired power cord and fuse holder], fan assembly (5), bulb socket (6), ON / STANDBY switch (7), counterbalance assembly (8), ball pivot joint assembly (9) which includes ball pivot stop (10), lamp tube pivot stop (11), lighthead pivot bearing stop (12), lamp tube brake assembly (13), lighthead brake assembly (14), iris diaphragms (15), lenses (16).

B. Theory of Operation (Refer to Section V for wiring diagrams / electrical schematics)

Line voltage (approximately 110-120 VAC) is supplied thru the line fuses (F1) to the primary winding tap of the transformer. If too much current is drawn by the lighting system's circuitry, the line fuse (F1) blows.

Transformer will provide 20.82 +/- 0.62 VAC output *with the light and fan ON*, based on an ideal 120.0 VAC input. The transformer is designed with three different primary input taps which can be adjusted for varying voltages at different facilities. All units are wired to the 120.0 VAC (orange) transformer input tap at the factory. This input tap is designed to accomodate voltages between 117.0 and 123.0 VAC. If the facility's voltage is known to be higher / lower than this range, the transformer input tap should be adjusted accordingly. If the unit will be used in more than one location, the average voltage level of *all locations* should be used when making the transformer input tap adjustment. If the facility's average voltage is 117.0 VAC or lower, the 114.0 VAC (yellow) transformer input tap must be used. If the facility's average voltage is 123.1 or higher, the 126.0 VAC (red) transformer input tap must be used. Using the correct transformer input tap will result in a transformer output of 20.82 +/- 0.62 VAC when the light and fan are ON.

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SECTION I
GENERAL INFORMATION

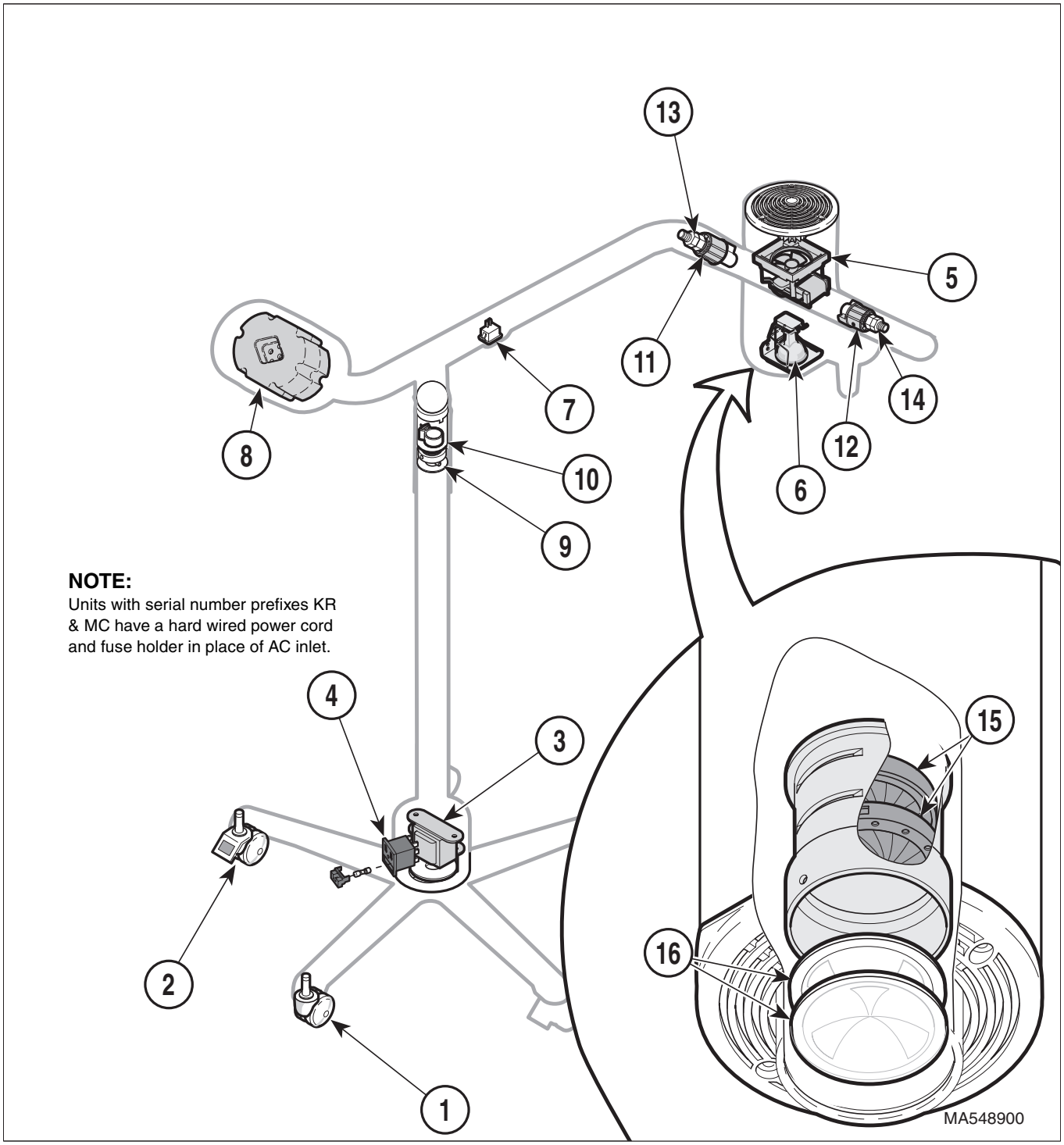

Figure 1-1. Major Components

When the ON / STANDBY switch is switched to ON, the output voltage from the transformer secondary tap is applied across the bulb assembly and the fan motor, causing the bulb to illuminate and the fan to operate. Turning the ON / STANDBY switch to STANDBY opens the circuit, causing the bulb to stop illuminating and the fan to stop operating. However, power is still applied to the primary side of the transformer.

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1.4 Specifications

Factual data for the 354 Mobile Lighting System is provided in Table 1-1. Also, see Figure 1-2.

Table 1-1. Specifications

Description	Data
Weight of a Unit:	
Boxed Weight	78.0 lbs (35.4 kgs)
Unboxed Weight	59.0 lbs (26.8 kgs)
Shipping Carton:	61.0 in. "L" x 30.5 in. "W" x 10.5 in. "H" (154.9 cm x 77.5 cm x 26.7 cm)
Beam diameter @ 36 inches: (91.4 cm)	Variable from 3 to 10 in. (7.6 to 25.4 cm)
Diameter of Lighthead:	5.0 in. (12.7 cm)
Focal Length:	36 in. (91.4 cm)
Reach of Arm Assemblies:	26 in. (66.0 cm) maximum (from centerline of vertical tube to center of lighthead)
Length of Counterbalance:	42 in. (107 cm)
Diameter of Caster base:	28 in. (71 cm)
Minimum Lighthead Height:	< 44 in. (112 cm)
Maximum Lighthead Height:	> 71 in. (180 cm)
Maximum Overall Height:	< 85.0 in. (216 cm)
Rotation of Lighthead:	180° of rotation at lamp tube connection
Rotation of Lamp Tube:	540° of rotation at cross tube connection
Rotation of Cross Tube:	580° of rotation at vertical tube connection
Vertical Range of Cross Tube:	-35° to +35° of vertical movement

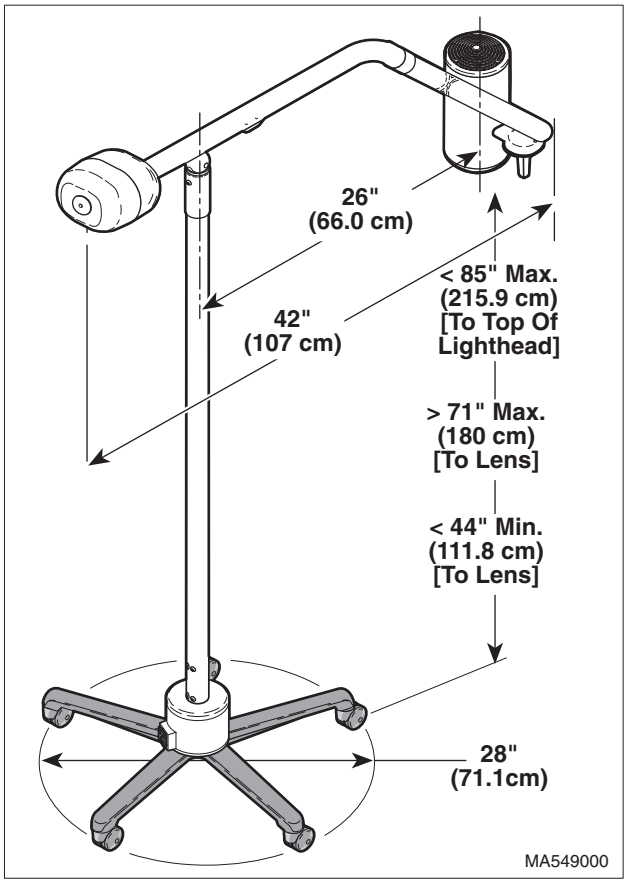

Figure 1-2. Dimensions

Power Cord:	Harmonized cordage, 96 in. (2.44 m) w/ hospital grade grounding type plug
Bulb:	21 VAC, 150 W Bulb
Electrical Requirements:	120 VAC, 60 HZ, 1.5 amp, single phase
Power Consumption (at bulb):	20.0 VAC @ 6.9 amps = 139 WATTS

The following data applies to models with serial numbers KR1000 & MC1000 thru present:

Fuse Rating:	3.0 amp, 250 VAC 1/4 x 1 1/4, Type Slo-Blo
Illumination @ 36 in. (91.4 cm):	5,000 fc - 53,800 lux
Color Temperature:	3,200K

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SECTION I
GENERAL INFORMATION

The following data applies to models with serial numbers MV1000 thru present:

Fuse Rating: ..... 1.6 amp, 250 VAC, 5mm x 20mm, Type Slo-Blo

Illumination @ 36 in. (91.4 cm): .....4,000 fc - 43,000 lux

Color Temperature:.....4,200K

1.5 Parts Replacement Ordering

If a part replacement is required, order the part directly from the factory as follows:

(1) Refer to Figure 1-3 to determine the location of the model number and serial number of the lighting system and record this data.

(2) Refer to the Parts List (Section VI) to determine the part number, description, and quantity of parts needed and record this data.

NOTE
Ask the Purchasing Department of the company that owns the lighting system for this information. Otherwise, this information may be obtained from the dealer that sold the lighting system.

(3) Determine the installation date of the lighting system and record this data.

(4) Call Midmark's Technical Service Department with the recorded information. See back cover of this manual for the phone number or use the Fax Order Form (See page 7-2 for Fax Order Form).

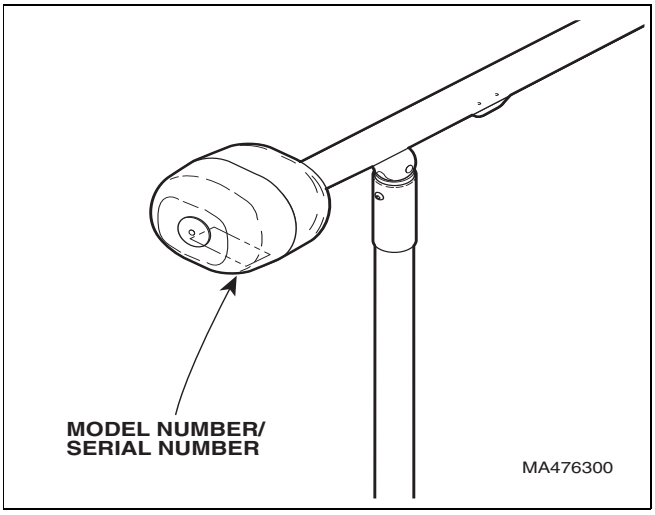

Figure 1-3. Model Number / Serial Number Location

1.6 Special Tools

Table 1-2 lists all of the special tools needed to repair the lighting system, how to obtain the special tools, and the purpose of each special tool.

Table 1-2. Special Tool List

Description of Special Tool	Manufacturer's Name / Address / Phone	Manufacturer's Part Number	Purpose of Special Tool
Multimeter	Commercially Available	Any Type	Used to perform continuity and voltage checks.
Torque Wrench	Commercially Available	Any Type	Used to tighten nuts or screws to specified values.

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SECTION II
TESTING AND TROUBLESHOOTING

2.1 Operational Test (See Figure 2-1)

In order to effectively diagnose a malfunction of the 354 Mobile Lighting System, it may be necessary to perform an operational test as follows:

WARNING
Refer to the Operator's Manual for complete instructions on operating the lighting system. Failure to do so could result in personal injury.

NOTE
The Operational Test describes what should happen when the lighting system is operated. If the lighting system does something other than described, a problem has been discovered. Refer to the Troubleshooting Guide to determine the cause of the problem and its correction.

(1) Plug the mobile light system into a grounded, non-isolated, correctly polarized outlet that has the proper voltage output for the unit.

(2) Turn the ON / STANDBY switch (1, Figure 2-1) to ON.

(3) ***Observe.*** The lighthead (2) should illuminate and the fan in the back of the lighthead should be operating.

(4) Position the lighthead (2) 36 in. (91.4 cm) from the table (or wall) and aim the light beam at the table (or wall).

(5) ***Observe.*** There should be an evenly distributed circular pattern of bright light, approximately 3 in. to 10 in. (7.6 cm to 25.4 cm) in diameter, on the table (or wall) surface.

(6) Rotate the lighthead (2), lamp tube (3), and cross tube (4) through their complete range of motion. (See Figure 2-1).

(7) ***Observe.*** The lighthead (2) should move easily through its entire range of motion. The light should not flicker intermittently when the lighthead is being positioned.

(8) Move the lighthead (2) to different positions, release the lighthead, and observe it.

(9) ***Observe.*** When the lighthead (2) is released in any position, no drifting should occur at any axis.

(10) Adjust the brightness control lever (5) through its range of motion.

(11) ***Observe.*** The light beam should brighten / darken as the brightness control lever (5) is adjusted.

(12) Position the brightness control lever (5) to get the maximum brightness and then adjust the beam size lever (6) through its range of motion.

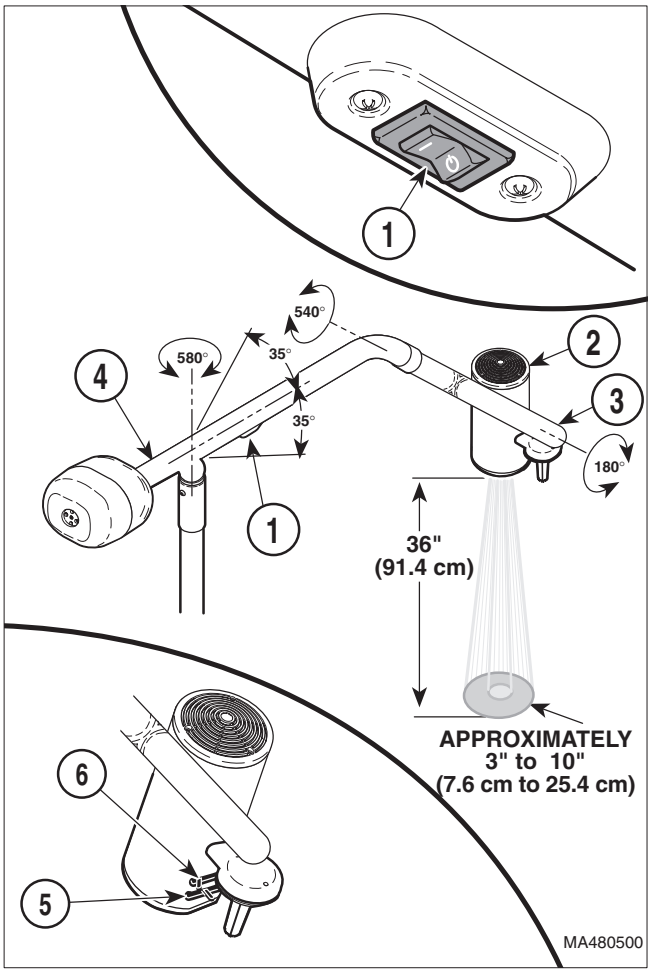

Figure 2-1. Operational Test

(13) ***Observe.*** The light beam pattern should change from approximately 3 in. (7.6 cm) to 10 in. (25.4 cm) as the beam size lever (6) is adjusted

(14) Turn the ON / STANDBY switch (1) to STANDBY.

2.2 Troubleshooting Procedures

Table 2-1 is a Troubleshooting Guide which is used to determine the cause of the malfunction.

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Table 2-1. Troubleshooting Guide

Problem	Symptom	Probable Cause	Check	Correction
Lighthead will not illuminate, and fan does not function.	Lighthead / fan will not function even though ON / STANDBY switch is turned to ON.	Facility circuit breaker providing power to unit is tripped.	Check to see if facility circuit breaker for unit is tripped.	If facility circuit breaker is tripped, determine what caused the circuit breaker to trip, correct the problem, and then reset / replace the circuit breaker.
		Line fuse(s) are blown.	Perform continuity check on line fuse.	Replace line fuse. Refer to para 4.2 ***or*** 4.3.
		Fuse holder malfunctioning. *(Early units only)*	Perform continuity check on fuse holder.	Replace fuse holder. Refer to para 4.23.
		A.C. Inlet malfunctioning *(Later units only)*	Perform continuity check on A.C. Inlet.	Replace A.C. Inlet. Refer to para 4.7.
		ON / STANDBY switch is malfunctioning.	Perform continuity check on ON / STANDBY switch.	Replace ON / STANDBY switch. Refer to para 4.8.
		Transformer is malfunctioning.	Check for 21-23 VAC across output leads of transformer when the ON / STANDBY switch is ON.	If 21-23 VAC is not present when ON / STANDBY switch is ON, replace transformer. Refer to para 4.5.
		Wiring is torn, broken, or disconnected somewhere within the arm assemblies.	Perform a continuity check on blue and brown wiring running from transformer to lighthead.	Replace or repair any torn, broken, or disconnected wiring.
	Lighthead / fan will not function or function intermittently when lighthead or arm assemblies are moved.	Wiring is torn, broken, or disconnected somewhere within the arm assemblies.	Perform a continuity check on blue and brown wiring running from transformer to lighthead.	Replace or repair any torn, broken, or disconnected wiring.
Fan functions properly, but lighthead will not illuminate.	Fan functions properly, but lighthead will not illuminate even though ON / STANDBY switch is turned to ON.	Bulb is burned out or has not been installed.	Replace suspect bulb with known working bulb.	Replace bulb. Refer to para 4.10.
		Bulb socket is corroded resulting in bad connection.	Clean bulb socket or replace with known working bulb socket.	Replace bulb socket. Refer to para 4.12.
		Wiring is torn, broken, or disconnected somewhere within the lighthead.	Check for torn, broken, or disconnected wiring within lighthead.	Replace or repair any torn, broken, or disconnected wiring.
Lighthead illuminates properly, but fan will not function.	Lighthead illuminates properly, but fan will not function even though ON / STANDBY switch is turned to ON.	Wiring is torn, broken, or disconnected somewhere within the lighthead.	Check for torn, broken or disconnected wiring within lighthead; also check for heat damage to lenses.	Replace or repair any torn, broken, or disconnected wiring. Replace any damaged lenses. Refer to para 4.12.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
Lighthead illuminates properly, but fan will not function. ***- Continued***	Lighthead illuminates properly, but fan will not function even though ON / STANDBY switch is turned to ON. - *Continued*	Fan assembly is malfunctioning.	Replace suspect fan assembly with known working fan assembly; also check for heat damage to lenses.	Replace fan assembly. Refer to para 4-11. Replace any damaged lenses. Refer to para 4.13.
Control lever(s) will not function.	Control lever does not adjust brightness / beam size.	Iris diaphragm is malfunctioning.	Replace suspect iris diaphragm with known working iris diaphragm.	Replace iris diaphragm. Refer to para 4.14.
		Iris diaphragm is rotating inside optic assembly.	Check for loose screws holding optic housing to front cover.	Re-align iris diaphragm(s). Refer to para 4.14.
Arm assembly(ies) or lighthead does not rotate freely or drifts when released in desired position.	Cross tube rotates (at ball pivot joint) too stiffly or drifts when released in desired position.	Cross tube counterbalance needs to be adjusted.	Remove all tension from the ball pivot joint and observe to see if the cross tube counterbalances correctly.	Perform the cross tube counterbalance adjustment. Refer to para 4.15. Then, perform the ball pivot joint tension adjustment. Refer to para 4.16.
		Ball pivot joint tension needs to be adjusted.	Check ball pivot joint for looseness or stiffness.	Perform the cross tube counterbalance adjustment. Refer to para 4.15. Then, perform the ball pivot joint tension adjustment. Refer to para 4.20.
	Lamp tube does not rotate freely (at cross tube) or drifts when released in desired position.	Lamp tube brake tension needs to be adjusted.	Check for looseness or stiffness in joint.	Adjust the brake tension of the lamp tube. Refer to para 4.18.
	Lighthead does not rotate freely (at lamp tube) or drifts when released in desired position.	Lighthead brake tension needs to be adjusted.	Check for looseness or stiffness in joint.	Adjust the brake tension of the lighthead. Refer to para 4.19.
Arm assemblies can be rotated farther than specified.	Cross tube can be rotated more than 580° in one direction.	Ball pivot stop is broken.	Check for broken ball pivot stop.	Replace ball pivot stop. Refer to para 4.17.
	Lamp tube can be rotated more than 540° in one direction.	Lamp tube pivot stop is broken.	Check for broken lamp tube pivot stop.	Replace lamp tube pivot stop. Refer to para 4.22.
	Lighthead can be rotated more than 180° in one direction.	Lighthead pivot bearing stop is broken.	Check for broken lighthead pivot bearing.	Replace lighthead pivot bearing stop. Refer to para 4.20.
Lighthead will not operate properly.	Lighthead assembly illuminates, but not at the correct intensity.	Halogen bulb not illuminating at proper intensity.	Replace suspect halogen bulb with known working halogen bulb.	Replace halogen bulb. Refer to para 4.10.
		Wrong input tap is being used on transformer or facility voltage level has changed.	Check to see if correct transformer input tap is being used.	Select the proper transformer input tap based on the facility voltage available. Refer to para 4.6.
		Transformer is malfunctioning.	Replace suspect transformer with known working transformer.	Replace transformer. Refer to para 4.5.
		Bulb socket corroded resulting in bad connection or high resistance.	Clean bulb socket or replace suspect bulb socket with known working bulb socket.	Replace bulb socket. Refer to para 4.12.

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Table 2-1. Troubleshooting Guide - Continued

Problem	Symptom	Probable Cause	Check	Correction
Lighthead will not operate properly. -Continued	Lighthead assembly illuminates, but not at the correct intensity. -Continued	Lenses are clouded, dirty or damaged.	Clean lenses or replace with new lens(es).	Replace lens(es). Refer to para 4.13.
		Components of lighthead have been damaged / abused to the point that the lighthead is no longer in tolerance.	—	Return lighthead to Midmark for repair. Call 1-800-MID-MARK and ask for Medical Products Technical Service.
Mobile light brake casters do not work.	Mobile light moves even though caster brakes are set.	Caster brakes are worn or malfunctioning.	Check for wear or broken parts.	As necessary, replace brake casters. Refer to para 4.21.

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SECTION III
SCHEDULED MAINTENANCE

3.1 Scheduled Maintenance

Table 3-1 is a Scheduled Maintenance Chart which lists the inspections and services that should be performed periodically on the 354 mobile lighting system. These inspections and services should be performed as often as indicated in the chart.

Table 3-1. Scheduled Maintenance

Interval	Inspection or Service	What to Do
Semi-annually	Obvious damage	Visually check condition of lighting system for obvious damage such as: cracks in components, missing components, dents in components, or any other visible damage which would cause the lighting system to be unsafe to operate or would compromise its performance. Repair lighting system as necessary.
	Fasteners / hardware	Check lighting system for missing or loose fasteners / hardware. Replace any missing hardware and tighten any loose hardware as necessary.
	Warning and instructional decals	Check for missing or illegible decals. Replace decals as necessary.
	Casters	Check all casters for broken, cracked, or worn components. Check that the brakes on the two brake casters lock correctly and keep the mobile light from moving when locked.
	Lighthead assembly	**CAUTION:** Use only a Quarternary / Ammonia - base Germicide type cleaner to clean the plastic on the lighthead assembly. Other cleaners could pit or cloud the plastic. For the housing portion of the lighthead, use a soap and water solution to remove dirt and stains; for tougher stains, a standard household cleaner may be used.
	Fan	Check fan for proper operation. Verify that fan is operating when light is turned on. Replace fan assembly if necessary. Refer to para 4.11. **CAUTION:** Operating lighthead without a fan in operation may cause lenses to melt.
	ON / STANDBY switch	Check the ON / STANDBY switch for proper function. Replace ON / STANDBY switch if necessary. Refer to para 4.8.
	Integrity of wiring and / or connections	Move each axis thru its full range of motion while observing the light beam for intermittent flickering or light beam going out completely. Repair wiring or wiring connections as necessary.
	Rotation of all axis	Check each axis to ensure ease of movement and positioning with no drifting after being released. Adjust tension of brakes if drifting is observed. Make sure each axis cannot rotate more than is specified in Figure 2-1. If so, replace pivot stops / pivot bearing stops as necessary.
	Ball pivot joint	Check that cross tube can rotate +35° to -35°. Check for drifting of cross tube after it is released in a position. If necessary, adjust the ball pivot joint tension. Refer to para 4.20.
	Bulb	Check for a missing or burned out bulb. Replace bulb if necessary. Refer to para 4.10.
	Bulb socket	Check bulb socket for corrosion or damage which would prevent posts of bulb from making good electrical contact with bulb socket. Clean or replace bulb socket. Refer to para 4.12.
	Adjustment levers	Check adjustment levers for proper operation. Verify that levers adjust the brightness and beam size of the spotlight. Replace iris diaphragm(s) if necessary. Refer to para 4.14.
	Operational Test	Perform an Operational Test to determine if the mobile light is operating within its specifications. Refer to para 2.1. Replace or adjust any malfunctioning components.

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SECTION IV
MAINTENANCE / SERVICE INSTRUCTIONS

4.1 Introduction

WARNING
Refer to the Operator Manual for complete instructions on operating the lighting system. Failure to do so could result in personal injury.

NOTE
Perform an operational test on the lighting system after the repair is completed to confirm the repair was properly made and that all malfunctions were repaired.

The following paragraphs contain removal, installation, repair, and adjustment procedures for the lighting system.

4.2 Fuse Removal / Installation (Applies to models with serial numbers KR1000 & MC1000 thru present)

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Turn the ON / STANDBY switch to standby and disconnect electrical power to unit.

(2) Simultaneously push in on fuse cap (1, Figure 4-1) and rotate 1/4 turn in the counterclockwise direction; then pull fuse cap from fuse holder (2).

(3) Pull fuse (3) out of fuse cap (1).

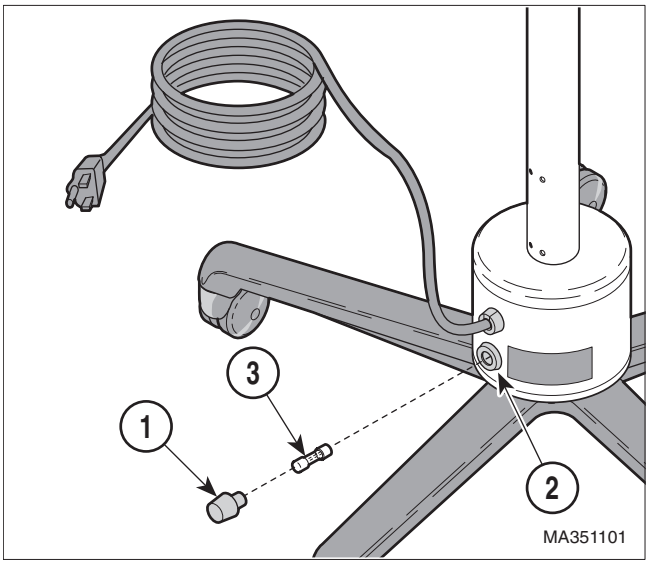

Figure 4-1. Fuse Removal / Installation

(4) Inspect fuse for any indication it has been blown. Perform continuity check on fuse. Discard fuse.

B. Installation

(1) Insert one end of new fuse (3) into the fuse cap (1).

(2) Simultaneously push fuse cap (1) into fuse holder (2) and rotate it 1/4 turn in the clockwise direction to secure it.

(3) Connect electrical power to unit and check light for output.

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4.3 Fuse Removal / Installation (Applies to models with serial numbers MV1000 thru present)

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Turn the ON / STANDBY switch to standby and unplug power cord from A.C. inlet (1, Fig. 4-2).

(2) Simultaneously push in on fuse drawer tab (A) while pulling outward to remove drawer (2).

(3) Pull two fuses (3) out of fuse drawer (2).

(4) Inspect fuses (3) for any indication they have been blown. Perform continuity check on fuses. Discard fuses.

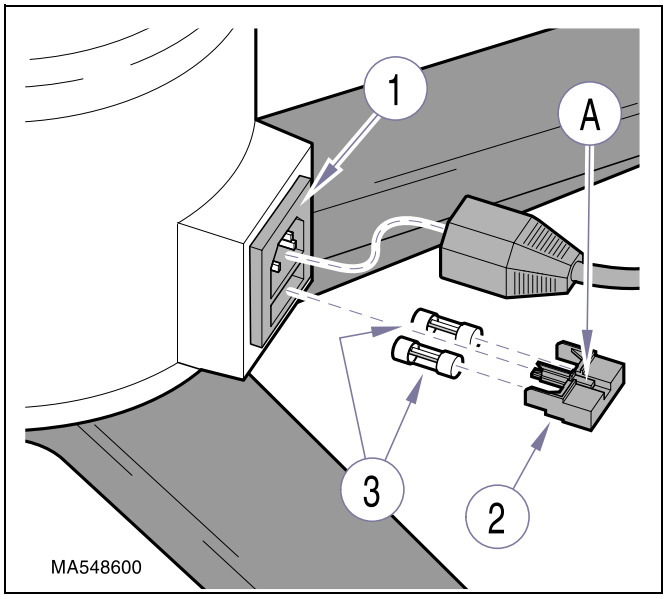

Figure 4-2. Fuse Removal / Installation

B. Installation

(1) Insert one end of new fuse(s) (3, Fig. 4-2) into the fuse drawer (2).

(2) Push fuse drawer (2) into A.C. inlet (1).

(3) Connect electrical power to unit and check light for output.

4.4 Cross Tube Counterbalance Assembly Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Remove screw (1, Figure 4-3) and slide ball pivot sleeve (2) down out of way.

(2) Pull brown and blue wires (3 & 4) out of bottom access hole (5), and disconnect wires.

NOTE
To prevent wires (4) from being pulled through vertical tube (6) while working, tape wires to vertical tube.

(3) Remove two screws (7) from holes marked with "A".

CAUTION
The cross tube counterbalance assembly is very heavy. You may need to use an assistant. Use proper lifting techniques to prevent injury or back strain.

EQUIPMENT ALERT
Be sure to support cross tube counterbalance assembly on each side of ball pivot housing when removing. Failure to do so could result in damage to lighthead.

(4) Remove ball pivot housing of counterbalance assembly (8) from vertical tube (6).

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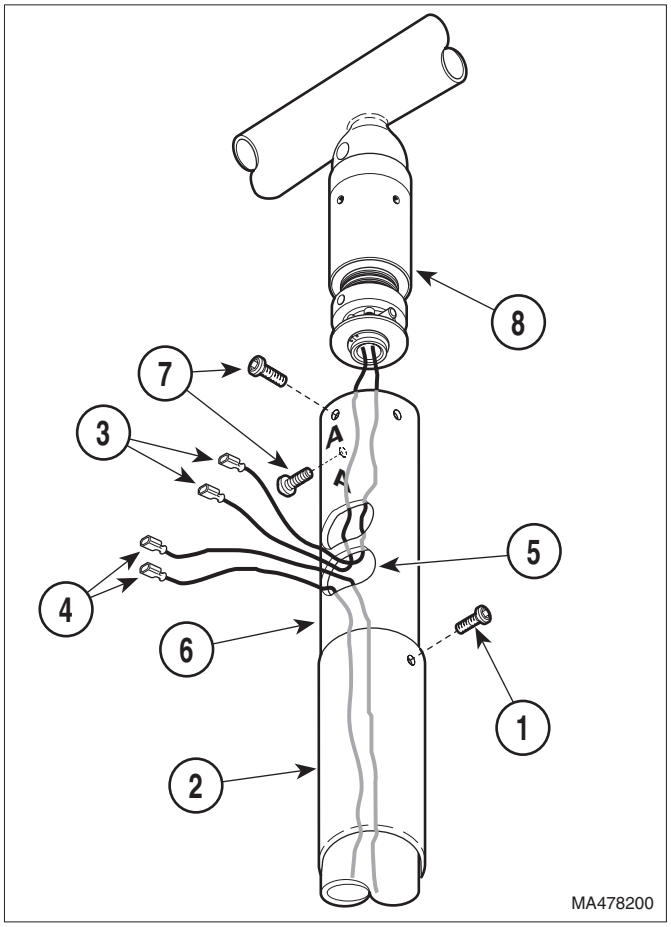

Figure 4-3. Cross Tube Counterbalance Assembly Removal / Installation

B. Installation

EQUIPMENT ALERT
Make sure all three screw holes on the vertical tube (6) are aligned with the three screw holes on the ball pivot housing of the counterbalance assembly before installing any screws. Failure to do so could result in damage to screw threads.

(1) Align three screw holes; then insert ball pivot housing of counterbalance assembly (8) into vertical tube (6) and secure with two screws (7), making sure to install the two screws (7) into the holes marked with an “A”.

(2) Pull two wires (3) from counterbalance assembly (8) through the bottom access window (5).

(3) Connect the brown wire (3) to brown wire (4) and blue wire (3) to blue wire (4). Push wires (3 & 4) inside bottom access window (5).

(4) Slide ball pivot sleeve (2) up into position and secure with screw (1).

4.5 Transformer Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit’s covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove cross tube counterbalance assembly. (Refer to para 4.4)

(3) Remove four screws (1, Figure 4-4) and separate vertical tube (2) from transformer housing assembly (3).

(4) Disconnect two wires (4) from two wires (5) and remove vertical tube (2).

(5) Remove nut (6), lockwasher (7), washer (8), transformer housing (3) and spacer disk (9) from base assembly (10).

NOTE
Using matchmarks will help align the bottom plate with the mounting holes in the transformer housing during assembly.

(6) Place matchmarks (A, Figure 4-5) on bottom plate (1) and transformer housing (2).

(7) Remove four screws (3) and bottom plate (1), from transformer housing (2).

NOTE
Models with serial numbers KR1000 and MC1000 thru present have a fuse holder instead of the A.C. inlet shown. The procedure is similar.

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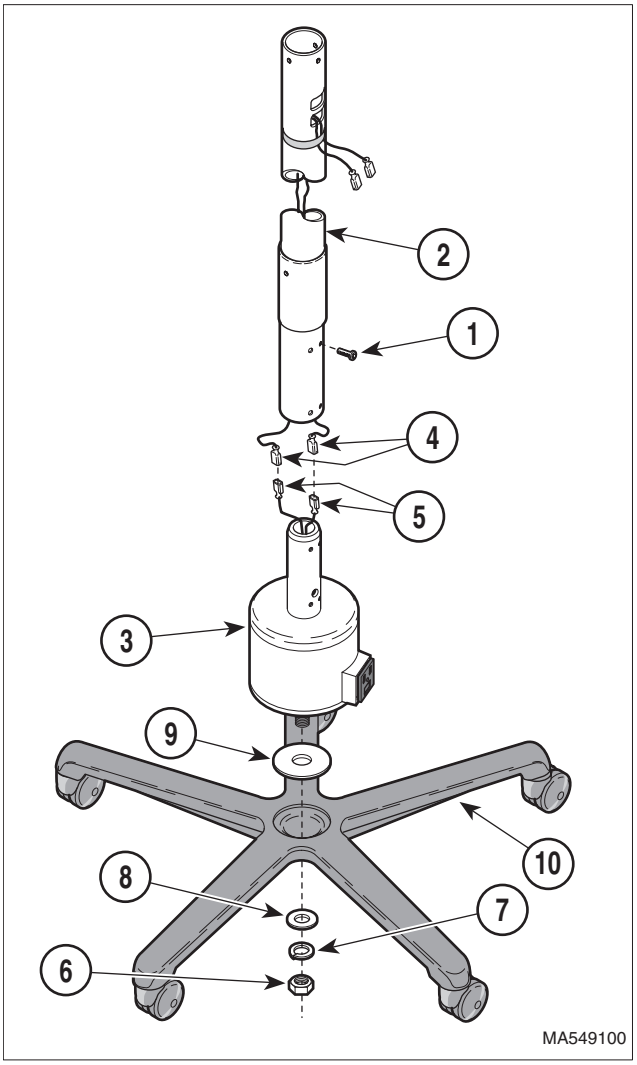

Figure 4-4. Transformer Housing Removal / Installation

(8) Disconnect black transformer wire (4) from terminal (5) of A.C. inlet.
[If unit does not have AC inlet, disconnect black transformer wire from terminal of fuse holder].

NOTE
Only one of the transformer input taps (yellow, orange or red) are used (which one is used depends on facility input voltage). The following step applies to the input tap being used.

(9) Tag and disconnect transformer input wire being used (yellow, orange, or red) (6) from A.C inlet (7) *[or fuse holder]*.

(10) Remove screw (8) and cut cable tie (9).

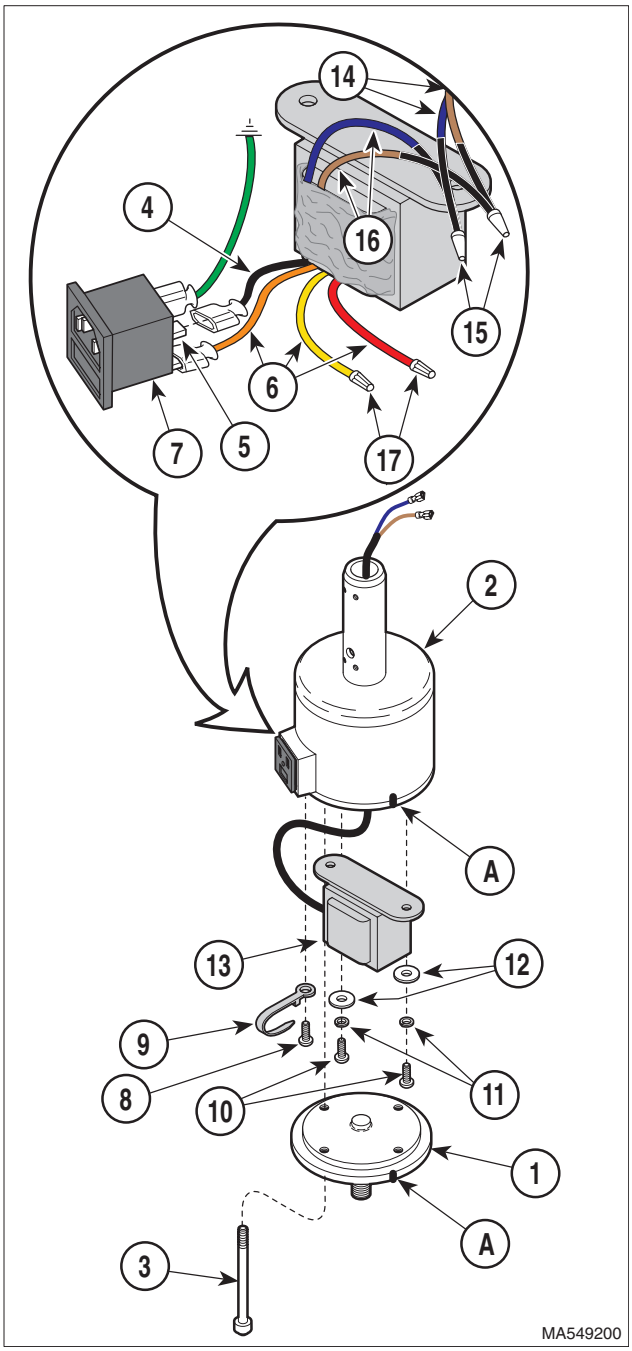

Figure 4-5. Transformer Removal / Installation

(11) Remove two screws (10), lockwashers (11), washers (12), transformer (13) and two jumper wires (14) from housing (2).

(12) Remove two wire caps (15) and disconnect two transformer output wires (16) from two jumper wires (14).

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(13) Remove heat shrink tubing (1, Figure 4-6) from transformer output wires (2).

B. Installation

(1) Install heat shrink tubing (1, Fig. 4-6) on two transformer output wires (2) and slide tubing to cover the entire length of the wires.

(2) Connect brown wire (16, Figure 4-5) to brown wire (14), and blue wire (16) to blue wire (14) and secure both connections with wire caps (15). Secure wire caps with electrical tape.

(3) Gather the two transformer output wires (16) and two jumper wires (14) with cable tie (9); then feed jumper wires (14) thru mounting tube of transformer housing (2) and secure cable tie to housing with screw (8).

(4) Install transformer (13) and secure transformer to housing (2) with two screws (10), lockwashers (11) and washers (12).

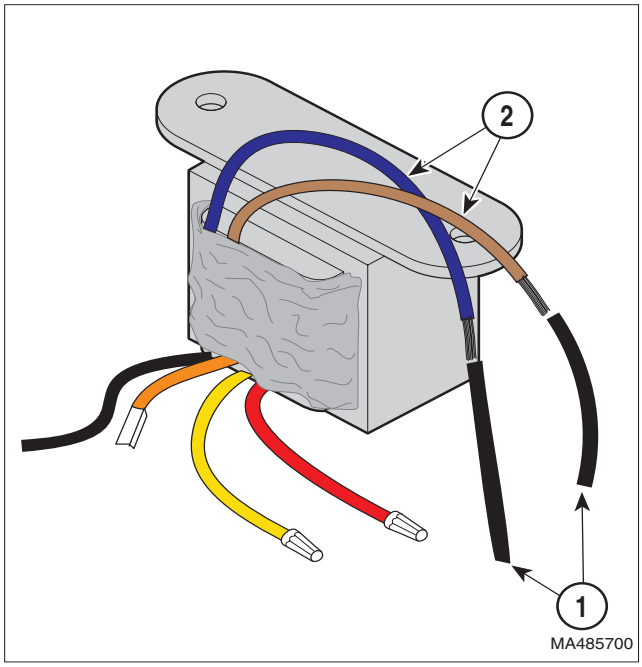

Figure 4-6. Heat Shrink Tubing Removal / Installation

(5) Install quick connect terminal and connect black transformer wire (4) to A.C. inlet terminal that has "L" marking *[or terminal of fuse holder]*.

NOTE
Make sure the same transformer input wire that was used on the old transformer is used on the new transformer. If necessary, perform transformer input tap adjustment (Refer to para 4.6).

(6) Install quick connect terminal and connect transformer input wire being used (yellow, orange, or red) (6) to A.C. inlet terminal that has "N" marking.
[If unit does not have AC inlet, connect transformer input wire being used to white wire from power cord].

(7) Place wire caps (17) on two unused transformer input taps and secure caps with electrical tape.

(8) Align matchmarks (A) and secure bottom plate (1) to transformer housing (2) with four screws (3).

(9) Install spacer disk (9, Figure 4-4) on center hole of base assembly (10).

(10) Secure transformer housing assembly (3) to base assembly (10) with washer (8), lockwasher (7), and nut (6). Tighten nut (6) to 35 - 45 ft.-lbs (47.5 - 61.0 N•m).

(11) Connect brown wire (4) to brown wire (5) and blue wire (4) to blue wire (5).

(12) Install vertical tube (2) on mounting tube of transformer housing assembly (3) and secure with four screws (1).

(13) Install cross tube counterbalance assembly. (Refer to para 4.4)

(14) Connect electrical power to unit.

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4.6 Transformer Input Tap Adjustment

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove cross tube counterbalance assembly. (Refer to para 4.4)

(3) Remove transformer housing assembly. Refer to para 4.5 (Removal - Steps 1 thru 5).

NOTE
Using matchmarks will help align the bottom plate with the mounting holes in the transformer housing during assembly.

(4) Place matchmarks (A, Figure 4-7) on bottom plate (1) and transformer housing (2).

(5) Remove four screws (3) and bottom plate (1) from transformer housing (2).

B. Adjustment

(1) Using a multimeter, measure the input voltage at *all* receptacles which will be used to power the unit. Calculate the average voltage and record this data.

NOTE
There are different levels of voltage at different facilities, however, the light is designed to work best at 120 VAC. The transformer has three input taps which can be used to adjust the transformer output based on what the facility voltage actually is. The following step selects the correct input tap for the facility.

Models with serial numbers KR1000 and MC1000 thru present have a fuse holder instead of the A.C. inlet shown. The adjustment procedure is similar.

(2) If voltage measured in step 1 was 117.0 VAC or lower, connect **yellow** transformer input lead (4) to AC inlet terminal marked with "N". If voltage measured in step 1 was 117.0 to 123.0 VAC, connect **orange** transformer input lead (4) to AC inlet terminal marked with "N". If voltage measured in step 1 was 123.1 VAC or higher, connect **red** transformer input lead (4) to AC inlet terminal marked with "N".
[If unit does not have AC inlet, connect transformer input wire being used to white wire from power cord].

(3) Place caps (5) on the two remaining (unused) transformer input leads. Secure caps with electrical tape.

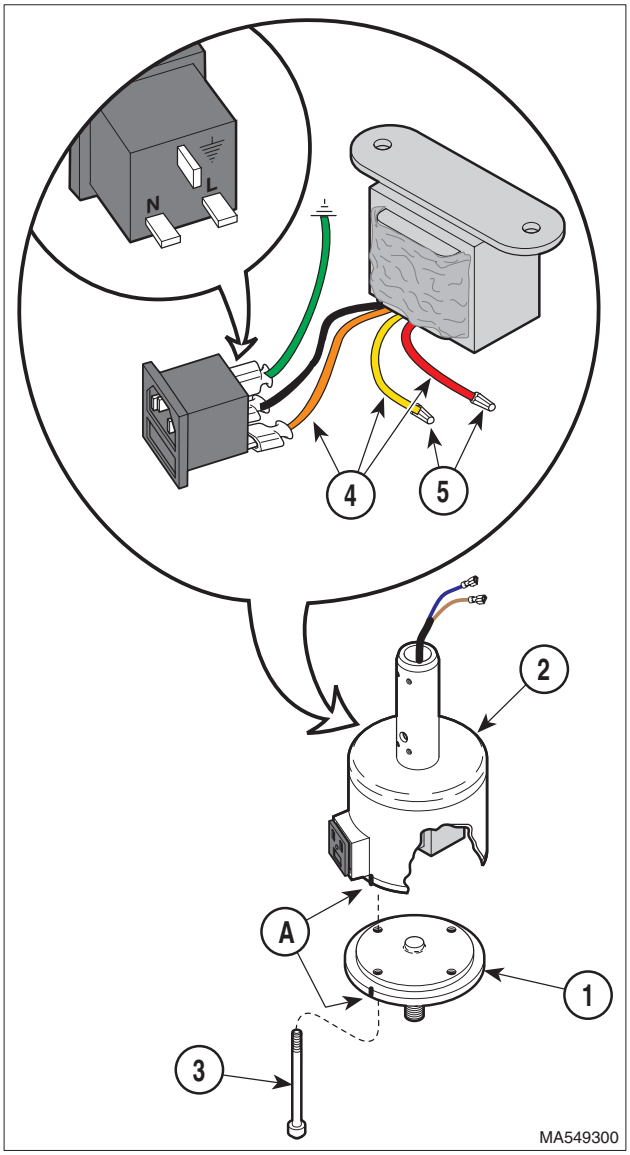

Figure 4-7. Transformer Input Tap Adjustment

C. Installation

(1) Align matchmarks (A, Figure 4-7) and install bottom plate (1) on transformer housing (2) and secure with four screws (3).

(2) Install transformer housing assembly. (Refer to Installation - steps 6 thru 9 of para 4.5).

(3) Install cross tube counterbalance assembly. (Refer to para 4.4).

(4) Connect electrical power to unit.

4.7 AC Inlet Removal / Installation (Applies to models with serial numbers MV1000 thru present)

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove cross tube counterbalance assembly (Refer to para 4.4).

(3) Remove transformer housing assembly (Refer to Removal - steps 1 thru 5 of para 4.5)

NOTE
Using matchmarks will help align the bottom plate with the mounting holes in the transformer housing during assembly.

(4) Place matchmarks (A, Figure 4-8) on transformer housing (1) and bottom plate (2).

(5) Remove four screws (3) and bottom plate (2) from transformer housing (1).

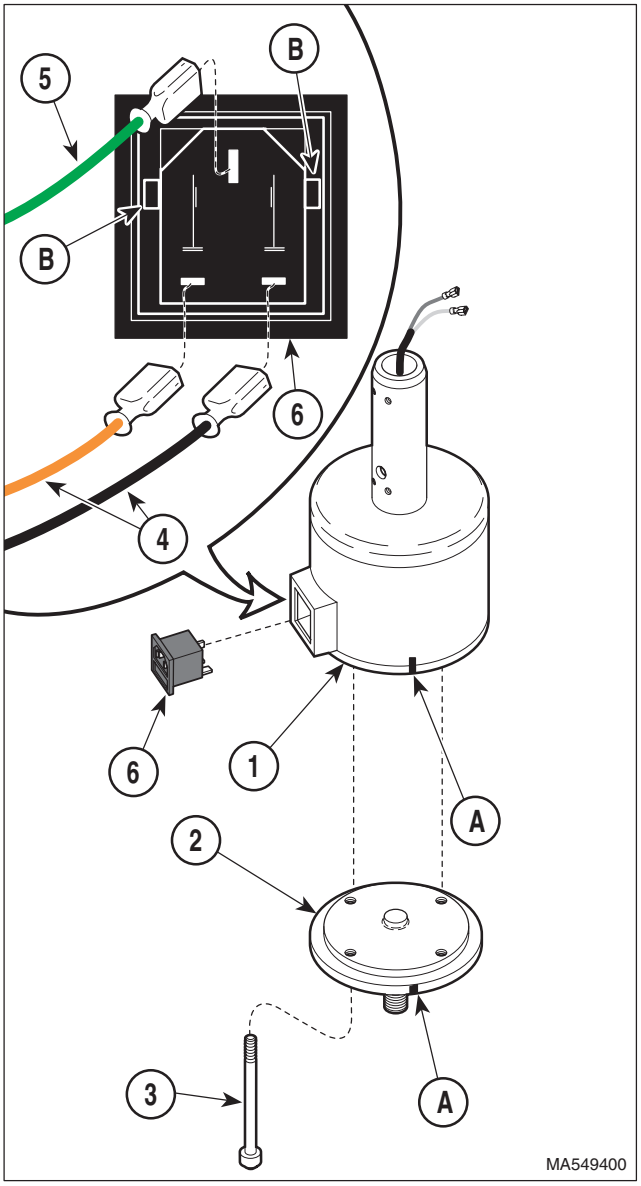

Figure 4-8. AC Inlet Removal / Installation

(6) Tag with position and disconnect input leads (4) and ground wire (5) from terminals of AC inlet (6).

(7) Press inward on two locking tabs (B) and pull AC inlet (6) from transformer housing (1).

B. Installation

(1) Push AC inlet (6) through hole in housing assembly (1) until it locks into place.

EQUIPMENT ALERT
Be sure to connect the transformer input leads to the correct terminals. Failure to do so could result in poor output or premature failure of bulb.

(2) Connect input leads (4) and ground wire (5) to terminals of AC inlet (6).

(3) Align matchmarks (A) and secure bottom plate (2) to transformer housing (1) with four screws (3).

(4) Install transformer housing assembly (Refer to Installation - steps 6 thru 9 of para 4.5)

(5) Install cross tube counterbalance assembly (Refer to para 4.4).

(6) Connect electrical power to unit.

4.8 ON / STANDBY Switch Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove two screws (1, Figure 4-9) and partially separate switch bezel (2) from cross tube weldment (3).

(3) Disconnect two wires (4) from terminals of ON / STANDBY switch (5).

(4) While simultaneously pressing on four locking tabs, push ON / STANDBY switch (5) out of switch bezel (2).

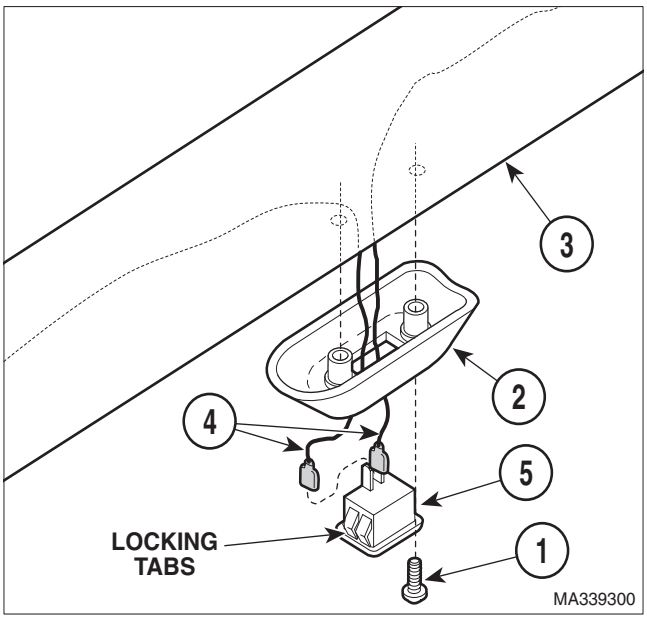

Figure 4-9. ON / STANDBY Switch Removal / Installation

B. Installation

(1) Press ON / STANDBY switch (5) into switch bezel (2) until it pops into place.

(2) Position ON / STANDBY switch (5) so the ON label "I" is located toward the ball pivot.

(3) Connect two wires (4) to terminals of ON / STANDBY switch (5).

(4) Install switch bezel (2) on cross tube weldment (3) and secure with two screws (1).

(5) Connect electrical power to unit.

4.9 Lighthead Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

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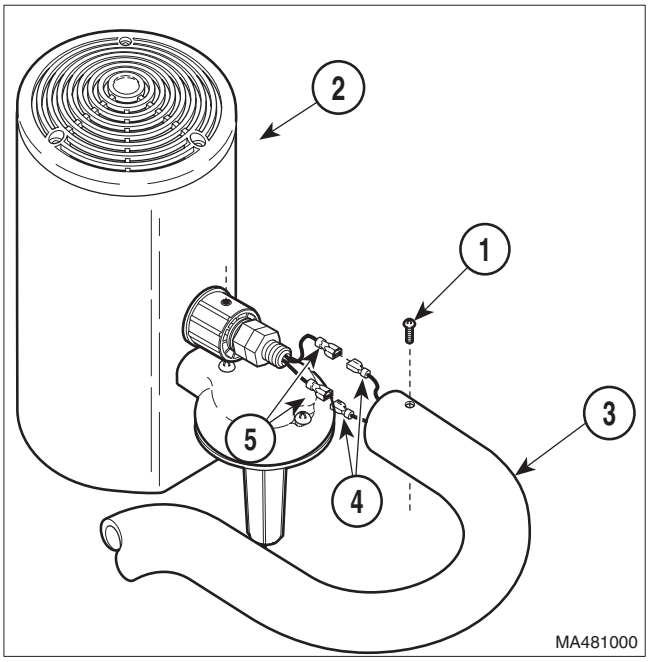

Figure 4-10. Lighthead Removal / Installation

(2) Remove two screws (1, Figure 4-10) and separate lighthead (2) from lamp tube (3).

(3) Disconnect two wires (4) from bulb socket wires (5). Remove lighthead (2).

B. Installation

(1) Position lighthead (2) near lamp tube (3); then connect two bulb socket wires (5) to wires (4).

WARNING
Make sure screws (1) are installed correctly. Failure to install screws correctly could allow lighthead to fall resulting in patient or staff injury.

(2) Install lighthead (2) on lamp tube (3) and secure with two screws (1).

4.10 Bulb Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

NOTE
Screw (1, Figure 4-11) is a captive screw. Only loosen captive screw; do not try to remove it.

The phillips head screw (1) is different from the other two screws on the top cap. Loosen this screw only to slide out the bulb carriage assembly (2); the other two screws secure the top cap to the fan mounting plate.

(2) Loosen screw (1, Figure 4-11) and slide bulb carriage (2) out of outer housing (3).

CAUTION
Bulb may be HOT! Allow bulb to cool for 4-5 minutes before attempting to remove. Otherwise, burns to the hands and fingers could result.

NOTE
Halogen bulbs are sensitive to body oils. Be sure not to touch the inside face of the reflector or glass capsule of the bulb during relamping or cleaning. Body oils create a hot spot on the bulb and may cause the bulb to burn out prematurely. If these portions of the bulb / reflector are handled, wipe with a clean, soft, lint free cloth. Wipe with alcohol and pat dry.

(3) Remove bulb (4) by pulling bulb ejector lever (5) to the rear and then gently pulling up on bulb.

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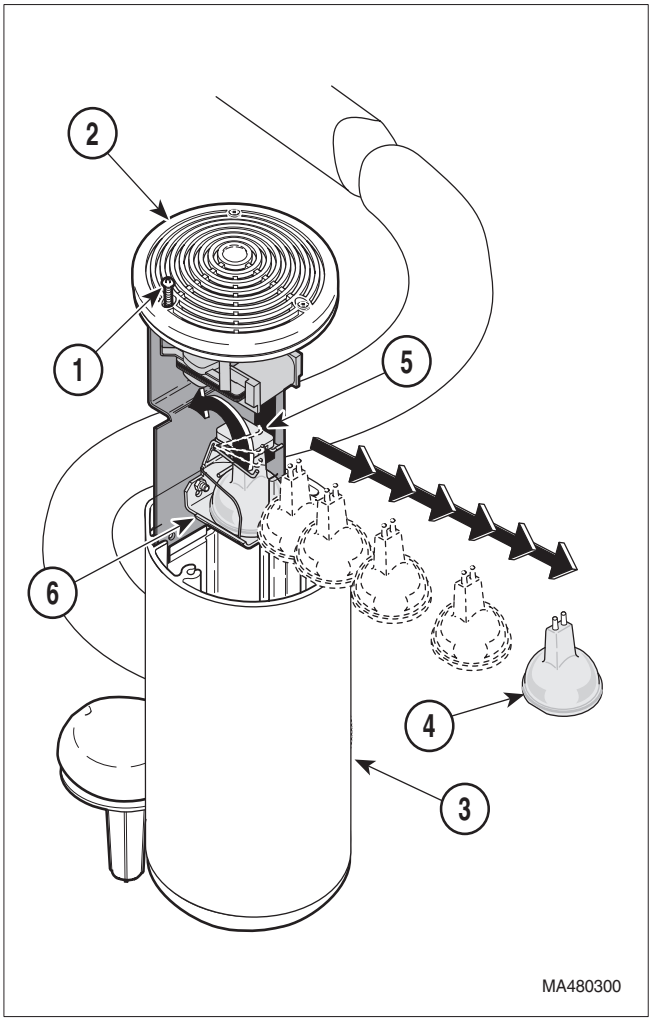

Figure 4-11. Bulb Removal / Installation

B. Installation

(1) Push bulb ejector lever (5) forward.

WARNING
The maximum allowable bulb wattage which can be used in this light is 150 Watts. There is a risk of fire if the 150 Watt limit is exceeded. Use Midmark Part Number: 015-1212-00.

NOTE
Halogen bulbs are sensitive to body oils. Be sure not to touch the inside face of the reflector or glass capsule of the bulb during relamping or cleaning. Body oils create a hot spot on the bulb and may cause the bulb to burn out prematurely. If these portions of the bulb / reflector are handled, wipe with a clean, soft, lint free cloth. Wipe with alcohol and pat dry.

(2) Insert bulb (4) into bulb socket (6) and push down until the base of the bulb is firmly seated against the bulb socket.

(3) Slide bulb carriage assembly (2) into outer housing (3) and secure by tightening screw (1).

4.11 Fan Assembly Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove screw (1, Figure 4-12) and slide bulb carriage (2) out of housing assembly (3).

(3) Remove two screws (4) and top cap (5) from bulb carriage (2).

(4) Remove four screws (6), nuts (7) and partially separate fan assembly (8) from bulb carriage (2).

(5) Cut wire tie (9) and remove nut (10).

(6) Remove two wire nuts (11) and fan assembly (8) from bulb carriage (2).

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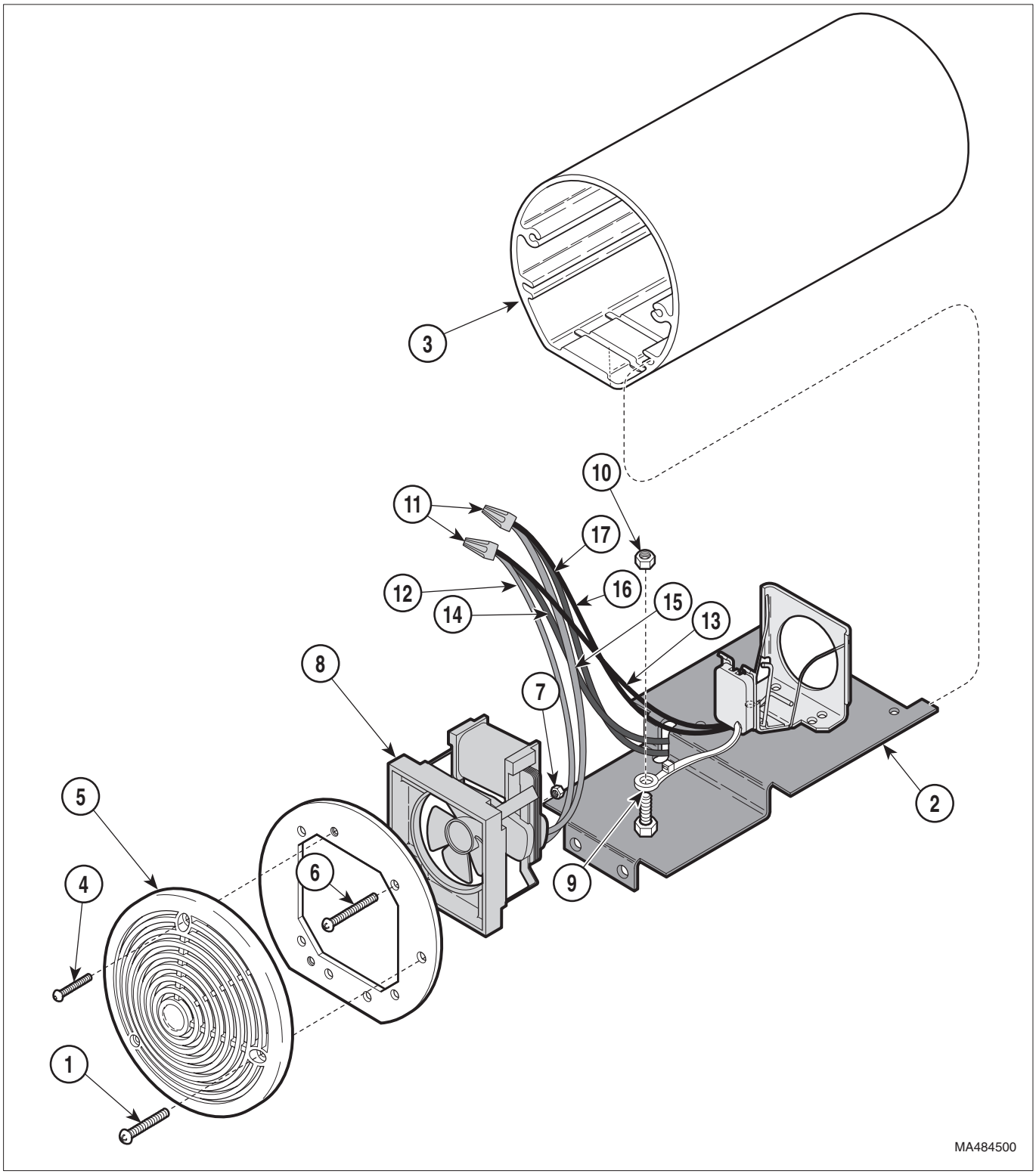

Figure 4-12. Fan Assembly Removal / Installation

B. Installation

(1) Connect fan wire (12) to bulb socket wire (13) and power wire (14); then connect fan wire (15) to bulb socket wire (16) and power wire (17); secure connections with two wire nuts (11). Secure wire nuts with electrical tape.

(2) Gather wires with wire tie (9); then secure wire tie to bulb carriage (2) with nut (10).

(3) Install fan assembly (8) and secure to bulb carriage (2) with four screws (6) and nuts (7).

(4) Secure top cap (5) to bulb carriage (3) with two screws (4).

(5) Slide bulb carriage (2) into housing (3) and secure with screw (1).

4.12 Bulb Socket Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

NOTE
The phillips head screw (1, Figure 4-13) is different from the other screws on the top cap. Loosen this screw *only* to slide out the bulb carriage assembly (2); the other two screws secure the top cap to the fan mounting plate.

(2) Loosen screw (1, Figure 4-13) and slide bulb carriage (2) out of housing assembly (3)

(3) Partially remove fan assembly. (Refer to Removal, steps 3 & 4 of para 4.11) .

NOTE
Halogen bulbs are sensitive to body oils. Be sure not to touch the inside face of the reflector or glass capsule of the bulb during relamping or cleaning. Body oils create a hot spot on the bulb and may cause the bulb to burn out prematurely. If these portions of the bulb / reflector are handled, wipe with a clean, soft, lint free cloth. Wipe with alcohol and pat dry.

(4) Remove bulb (4) by pulling ejector lever (5) to the rear and gently pulling up on bulb.

(5) Cut wire tie (1, Figure 4-14) and remove nut (2).

(6) Remove two screws (3) and nuts (4).

(7) Remove two wire caps (5) and bulb socket (6) from bulb carriage (7).

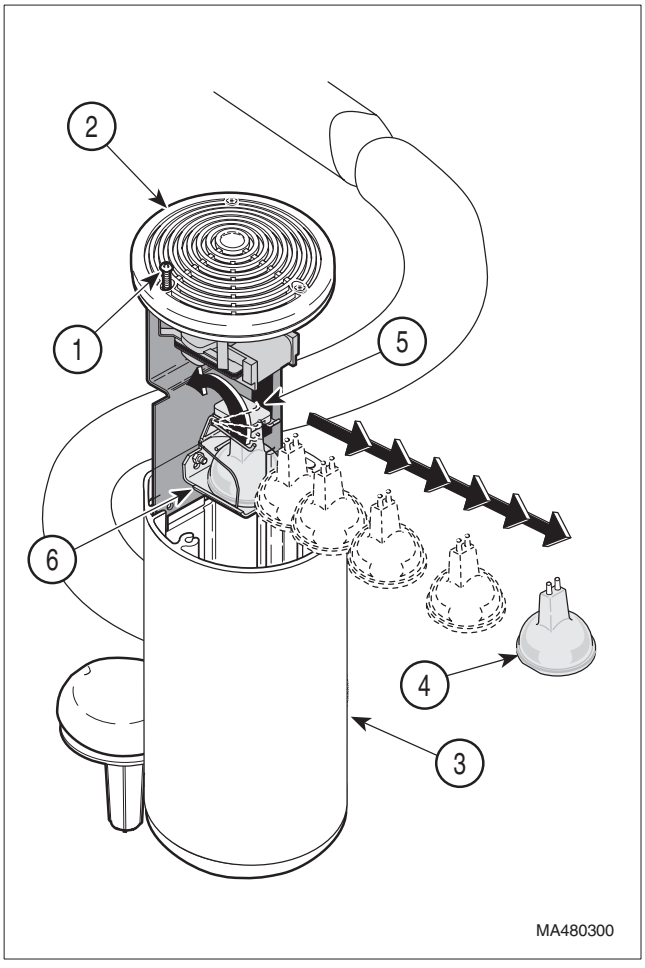

Figure 4-13. Bulb Removal / Installation

B. Installation

(1) Secure bulb socket (6) to bulb carriage (7) with two screws (3) and nuts (4)

(2) Connect bulb socket wire (8) to fan wire (9) and power wire (10); then connect bulb socket wire (11) to fan wire (12) and power wire (13); secure connections with two wire caps (5). Secure wire caps with electrical tape.

(3) Secure all wires with wire tie (1); then secure wire tie to bulb carriage (7) with nut (2)..

NOTE
Halogen bulbs are sensitive to body oils. Be sure not to touch the inside face of the reflector or glass capsule of the bulb during relamping or cleaning. Body oils create a hot spot on the bulb and may cause the bulb to burn out prematurely. If these portions of the bulb / reflector are handled, wipe with a clean, soft, lint free cloth. Wipe with alcohol and pat dry.

(4) Insert bulb (4, Figure 4-13) into bulb socket (5) and push down until the base of the bulb is firmly seated against the bulb socket.

(5) Install fan assembly. (Refer to Installation, steps 3 & 4 of para 4.11)

(6) Slide bulb carriage assembly (2) into housing assembly (3) and secure by tightening screw (1).

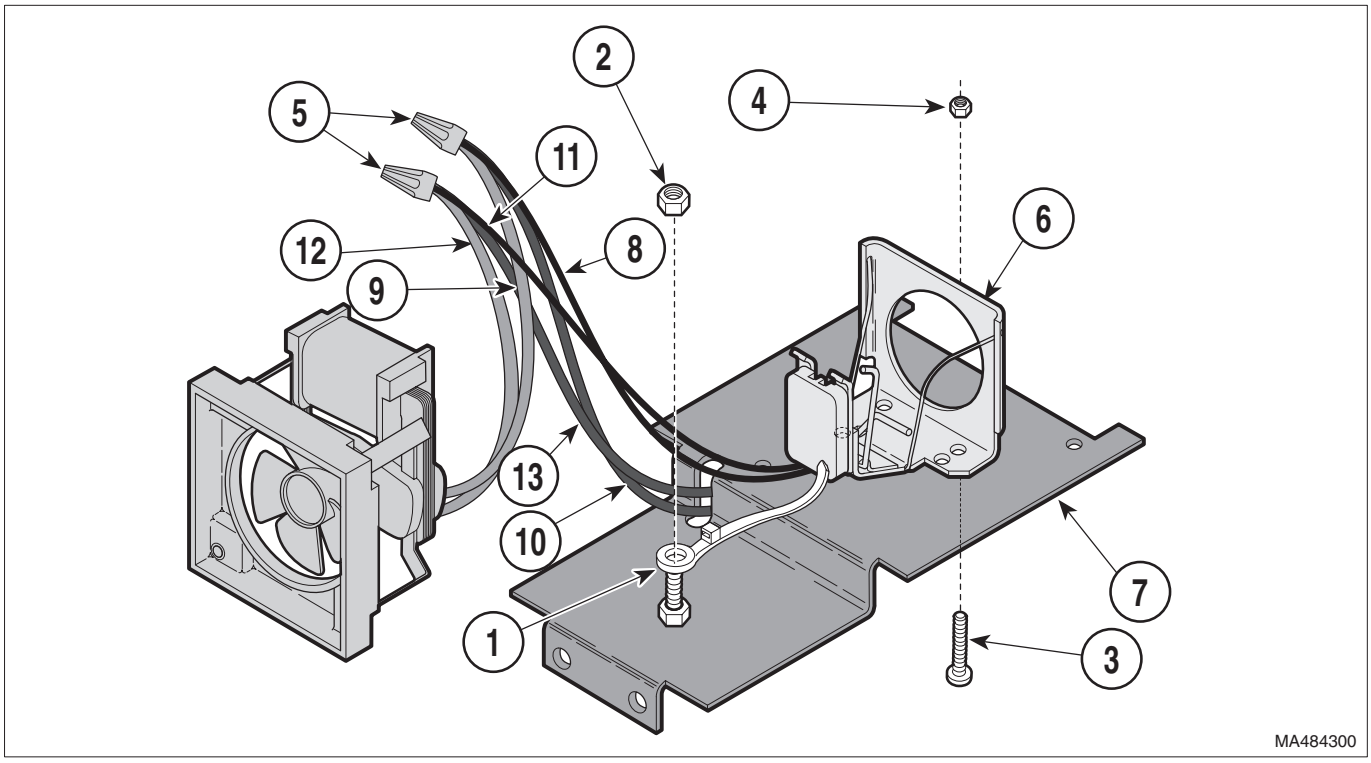

Figure 4-14. Bulb Socket Removal / Installation

4.13 Lens Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove two adjustment levers (1, Figure 4-15) by turning counterclockwise.

EQUIPMENT ALERT
After removing, place optic assembly on a flat surface, front cover down to avoid damage to lenses or cover glass.

(3) Remove two screws (2) and optic assembly (3) from housing (4).

(4) Remove three screws (1, Figure 4-16), washers (2), screen (3) and retaining disk (4).

NOTE
When removing the optic housing (5), be careful so as not to displace the two iris diaphragms located inside of the optic housing.

(5) Remove optic housing (5).

NOTE
To ease removal of two lenses (6) and spacer (7), cover the back of the front cover (8) with a soft clean cloth and gently turn front cover upside down.

(6) Remove lens (6), lens spacer (7) and lens (6) from front cover (8).

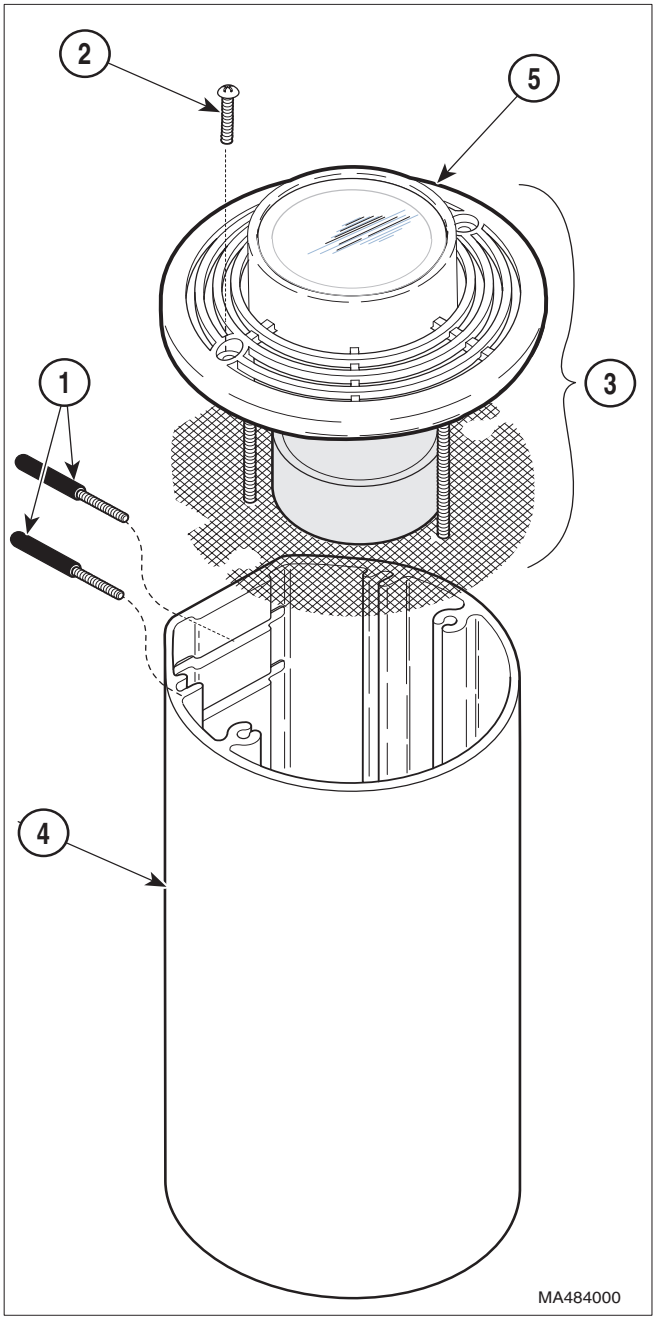

Figure 4-15. Optic Assembly Removal / Installation

B. Installation

NOTE
Verify that the O-ring (A, Figure 4-16) in the lip of the front cover (8) is in place and intact. If it is not, replace O-ring.

(1) Install lens (6), lens spacer (7) and lens (6) in front cover (8).

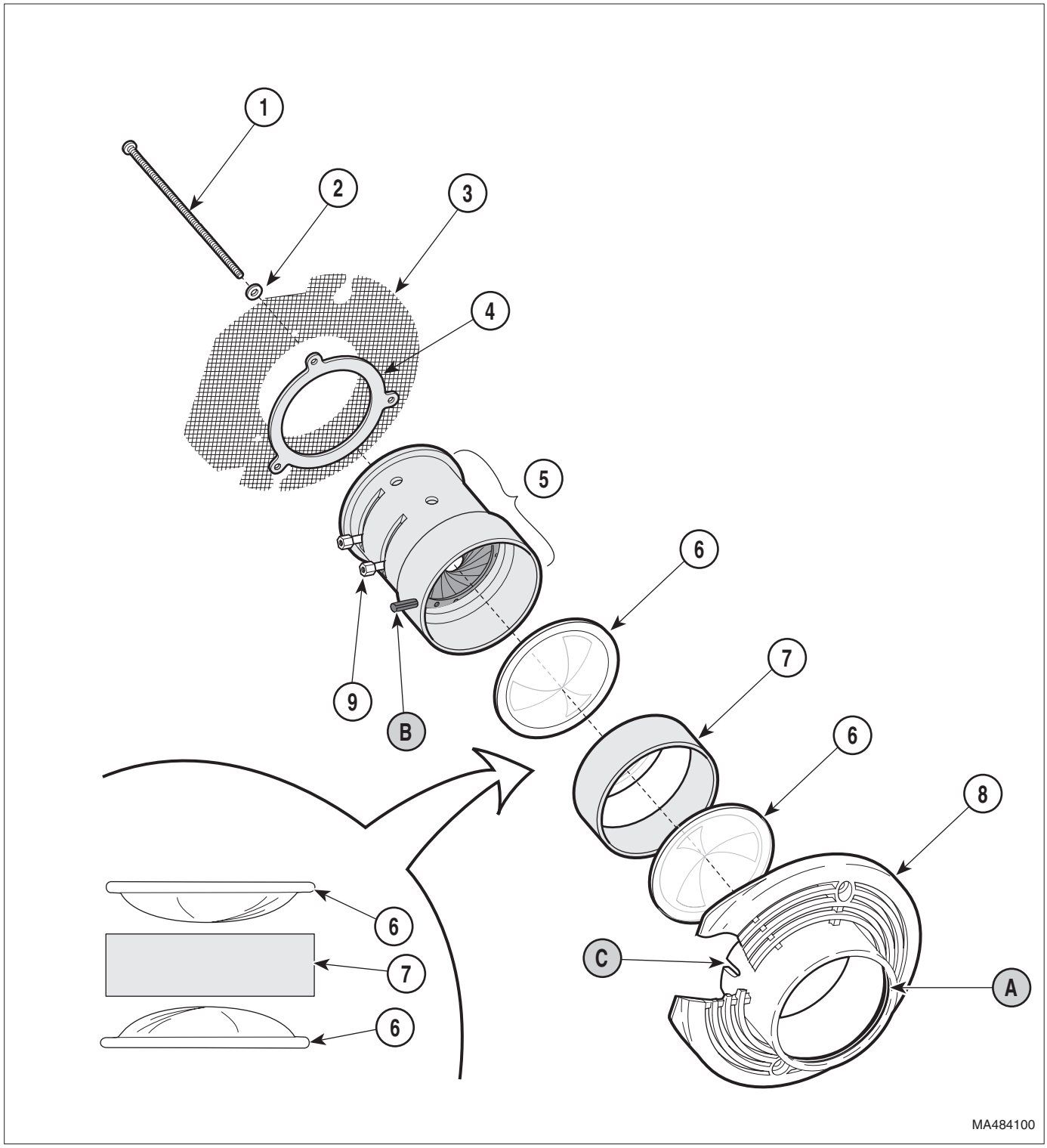

Figure 4-16. Lens Removal / Installation

(2) Place optic housing (5) onto front cover (8) positioning optic housing roll pin (B) in front cover notch (C).

EQUIPMENT ALERT
Tighten screws (1) until the tabs of the retaining disk (4) deflect *slightly.* Over-tightening could cause cover glass to break.

NOTE
Be sure iris diaphragms are in position before tightening screws (1). (Refer to Installation, steps 2 thru 4 of para 4.14).

(3) Install retaining disk (4), screen (3) and secure with three washers (2) and screws (1).

(4) Slide optic assembly (3, Figure 4-15) into housing (4) and secure with two screws (2).

EQUIPMENT ALERT
When installing adjustment levers, hand tighten only. Over-tightening could strip threads.

(5) Install two adjustment levers (1) thru slots in housing (4) and secure to hex nuts (9, Figure 4-15) by turning clockwise.

4.14 Iris Diaphragm Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove two adjustment levers (1, Figure 4-17) by turning counterclockwise.

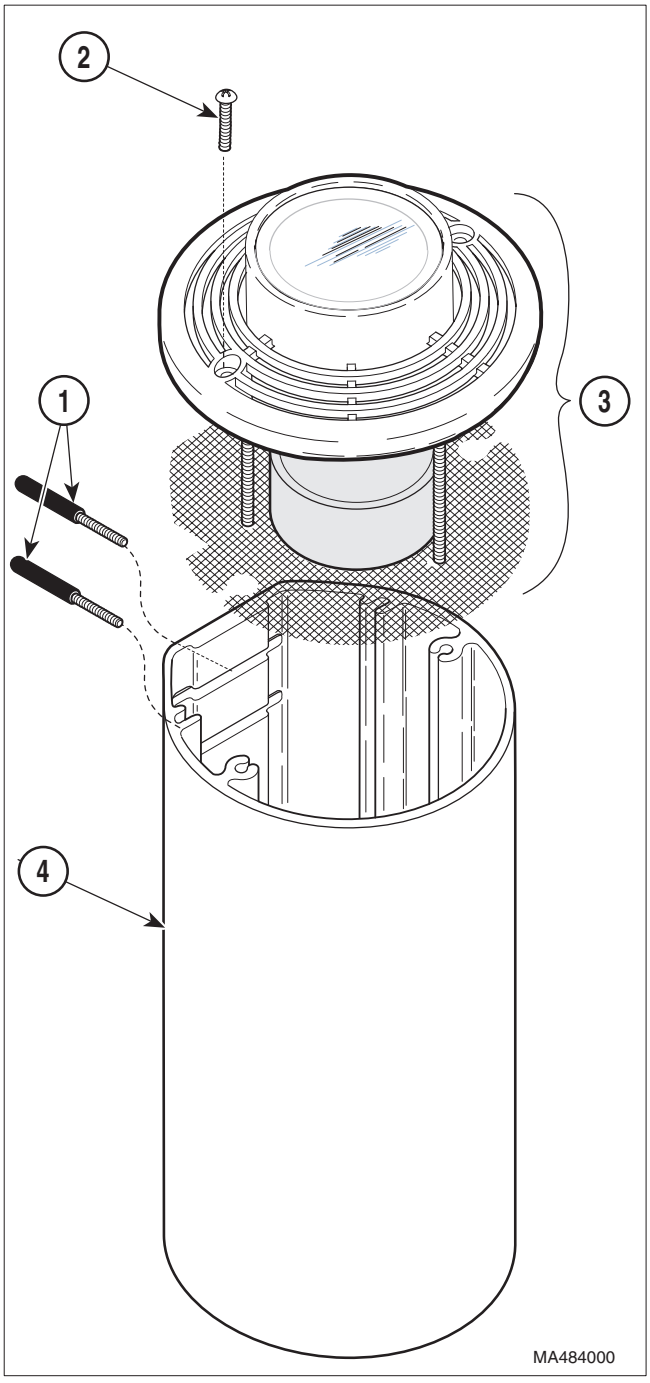

Figure 4-17. Optic Assembly Removal / Installation

(3) Remove two screws (2) and optic assembly (3) from housing (4).

EQUIPMENT ALERT
After removing, place optic assembly (3, Figure 4-17) on a flat surface, front cover (5) down to avoid damage to lenses or cover glass.

(4) Remove three screws (1, Figure 4-18), three washers (2), screen (3) and retaining disk (4).

(5) Remove cover glass (5) and O-ring (6).

(6) Remove hex nut (7), iris lever shank (8), spring (9), washer (10) and washer (11).

NOTE
To ease removal of spacers and iris diaphragms, cover the top of the optic housing (15) with a soft clean cloth and gently turn optic housing upside down.

(7) Remove cover spacer (12), iris diaphragm (13), iris spacer (14) and iris diaphragm (13) from optic housing (15).

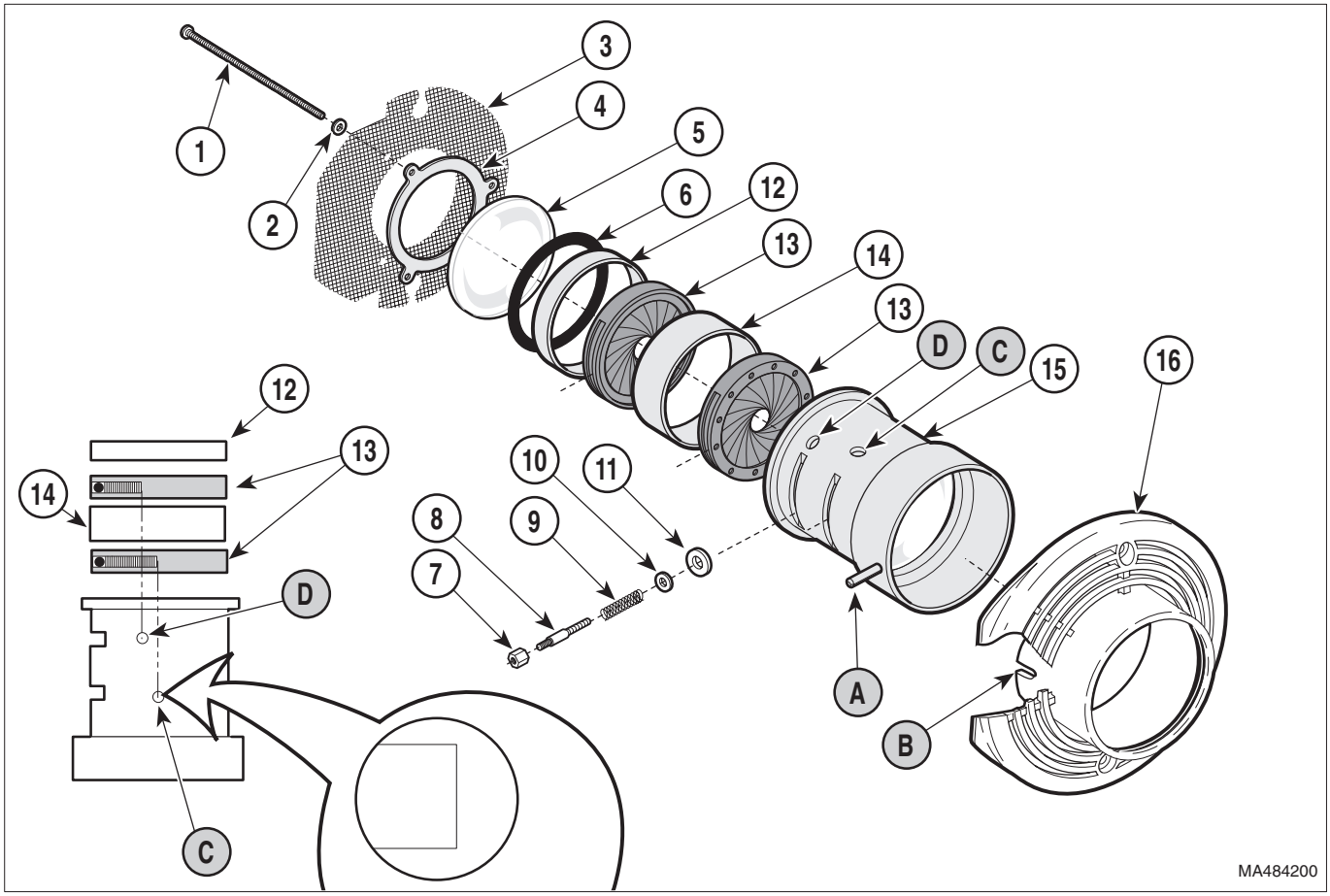

Figure 4-18. Iris Diaphragm Removal / Installation

B. Installation

(1) Place optic housing (15) onto front cover (16), positioning optic housing roll pin (A) in front cover notch (B).

NOTE
When installing, be sure the threaded holes in the iris diaphragms (13) align with the slots in the optic housing (15).

(2) Install first iris diaphragm (13) into optic housing (15) with the flat side downward. Rotate so that the edge of the iris diaphragm slot is centered in the aligning hole (C) of the optic housing (15).

(3) Install iris spacer (14) in optic housing (15).

(4) Install second iris diaphragm (13) into optic housing (15) with the flat side upward. Rotate so that the edge of the iris diaphragm slot is centered in the aligning hole (D) of the optic housing (15). Make certain that the first iris diaphragm did not move out of position.

(5) Install cover spacer (12), O-ring (6) and cover glass (5).

EQUIPMENT ALERT
Tighten screws (1) until the tabs of the retaining disk (4) deflect *slightly.* Over-tightening could cause cover glass to break.

NOTE
Before tightening screws (1), verify that the edges of the iris diaphragm slots are still centered in the aligning holes (C & D) of the optic housing (15).

(6) Install retaining disk (4), screen (3) and secure with washers (2) and screws (1).

EQUIPMENT ALERT
When installing iris lever shanks, hand tighten only. Over-tightening could strip threads.

(7) Slide spring (9), washer (10) and washer (11) on iris lever shank (8); then insert thru slot in optic housing (15) and turn clockwise into threaded hole of iris diaphragm (13).

(8) Thread hex nut (7) onto iris lever shank (8) hand tightening only.

(9) Slide optic assembly (3, Figure, 4-17) into housing (4) and secure with two screws (2).

EQUIPMENT ALERT
When installing adjustment levers, hand tighten only. Over-tightening could strip threads.

(10) Install two adjustment levers (1) thru slots in housing (4) and secure to hex nut (7, Figure 4-18) by turning clockwise.

4.15 Cross Tube Counterbalance Adjustment

A. Removal

(1) Remove screw (1, Figure 4-19) and slide ball pivot sleeve (2) down out of way.

(2) Rotate cross tube (3) until adjustment hole (4) appears in the adjustment window opening (A).

(3) Insert screwdriver into adjustment hole (4). Then, using screwdriver, rotate ball pivot cam (5) to assembly / disassembly setting. Remove screwdriver.

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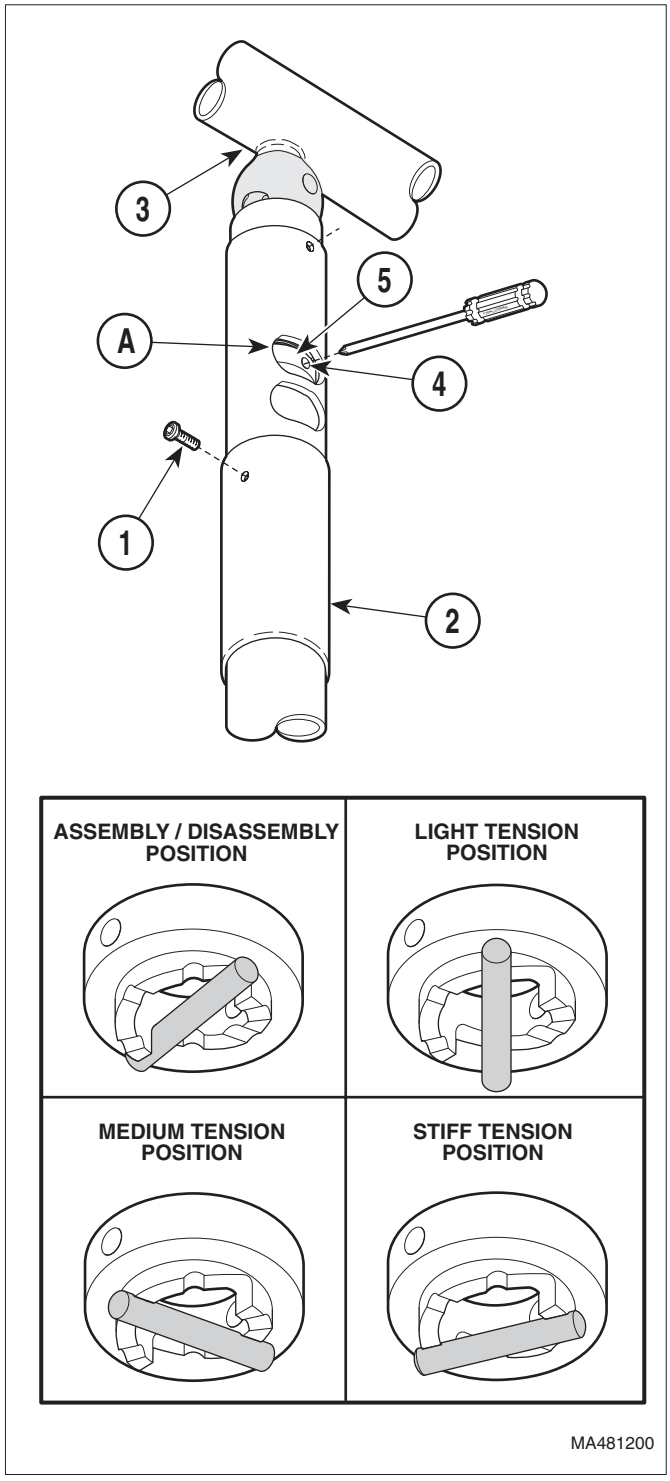

Figure 4-19. Tension Release

(4) Remove screw (1, Figure 4-20) and housing cap (2) from ballast housing (3).

NOTE

One way to determine if cross tube is balanced properly is to raise the cross tube above horizontal, release it, and observe where it stops. Then, lower the cross tube below horizontal plane, release it, and observe where it stops. The cross tube should return to the horizontal position and remain there; if it does, the cross tube counterbalance is adjusted properly.

Turning screw (4) in clockwise direction will raise lighthead end of cross tube. Turning screw (4) in counterclockwise direction will lower the lighthead end of cross tube.

(5) Adjust screw (4) until cross tube balances in a horizontal position.

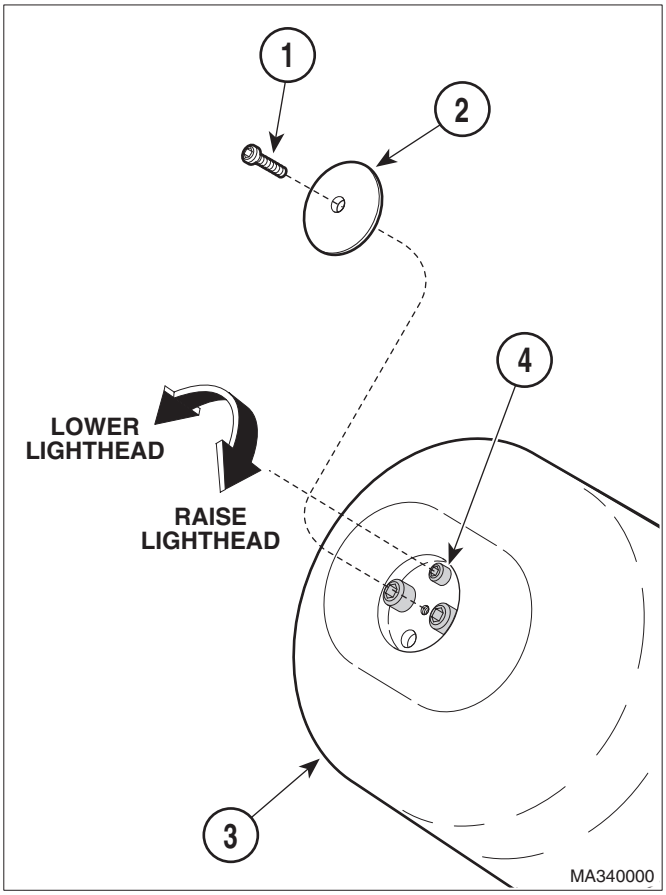

Figure 4-20. Cross Tube Counterbalance Adjustment

(6) Install housing cap (2) on ballast housing (3) and secure with screw (1).

NOTE
Factory recommendation: Start with the light setting and then proceed to the medium or stiff setting only if necessary to prevent drifting.

(7) Insert screwdriver into adjustment hole (4, Figure 4-19). Then, using the screwdriver, rotate ball pivot cam (5) to the light, medium, or stiff setting as desired by the operator(s). Remove screwdriver.

(8) Slide ball pivot sleeve (2) up into position and secure with screw (1).

4.16 Ball Pivot Joint Tension Adjustment

A. Adjustment

(1) Remove screw (1, Figure 4-21) and slide ball pivot sleeve (2) down out of way.

(2) Rotate cross tube (3) until adjustment hole (4) appears in adjustment window opening (A).

NOTE
There are three settings to which the ball pivot cam (5) can be set: light tension, medium tension, or stiff tension (see Figure 4-10). These settings may be changed according to the operator's preference.

(3) Insert screwdriver into adjustment hole (4). Then, using screwdriver, rotate ball pivot cam (5) to the desired tension setting.

(4) Remove screwdriver and move cross tube (3) about the ball pivot joint in a circular motion and up and down motion to ensure the setting is the one desired. Move cross tube (3) to a non-horizontal position and release it. The cross tube should not drift in any direction. If it does, a higher tension setting is required.

(5) Repeat steps 3 and 4 until the desired tension adjustment is achieved with no drifting of cross tube. If a satisfactory tension adjustment cannot be achieved, perform cross tube counterbalance adjustment procedure (refer to para 4.15) and then repeat ball pivot joint tension adjustment procedure.

(6) Slide ball pivot sleeve (2) up into position and secure with screw (1).

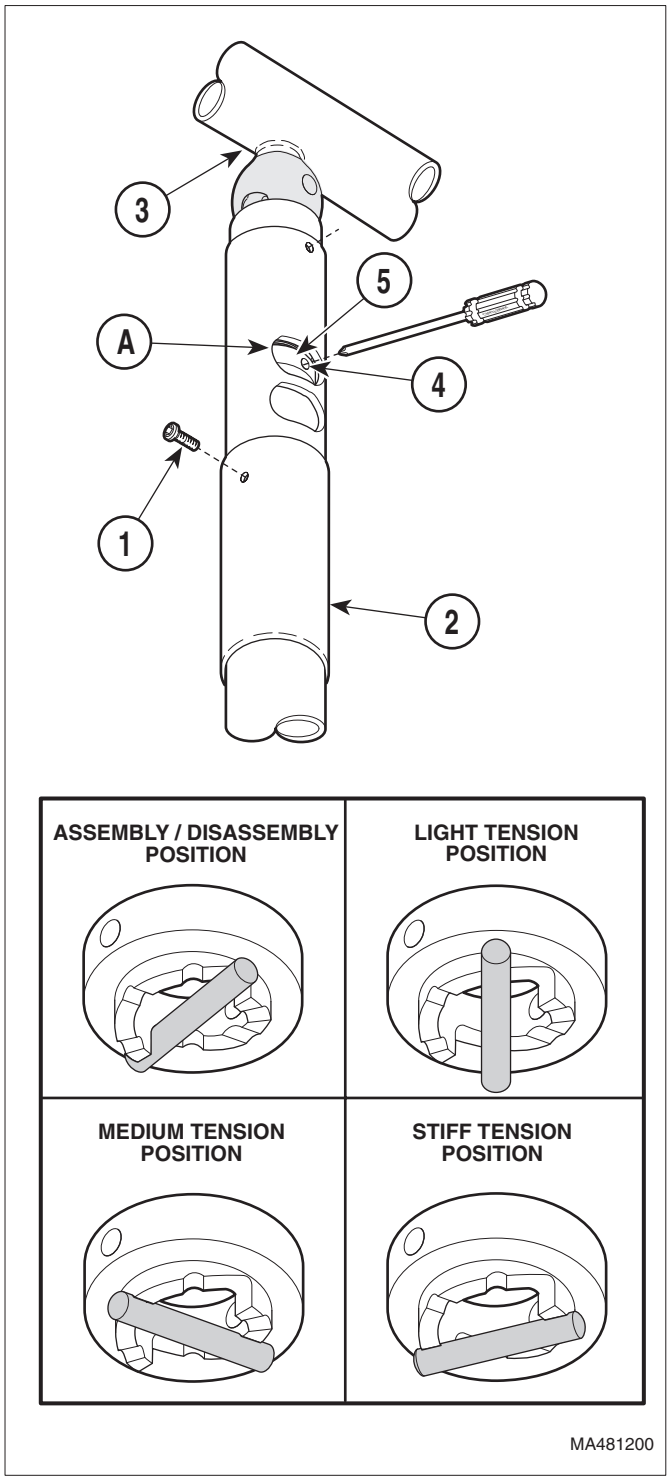

Figure 4-21. Tension Release / Adjustment

4.17 Ball Pivot and / or Ball Pivot Stop Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove cross tube counterbalance assembly from vertical tube. (Refer to para 4.4).

NOTE
Ball pivot joint will not have any tension on it at all if ball pivot cam is in proper position.

(3) Insert a screwdriver or punch into adjustment hole (1, Figure 4-22). Then, using the screwdriver, rotate ball pivot cam to "Assembly / Disassembly" position.

(4) Cut quick disconnect terminals (2) from two wires (3), making sure to cut as close to terminals as possible to preserve wire length.

(5) Using a hammer and punch, drive out groove pin (4) and remove ball pivot assembly (5) from cross tube (6).

B. Disassembly

(1) Using retaining ring pliers, remove retaining ring (1, Figure 4-23) and washer (2) from ball pivot shaft (3).

NOTE
There are serrations on one end of groove pin. Drive groove pin so serrations do not go thru ball pivot shaft.

(2) Using a hammer and punch, drive groove pin (4) out of ball pivot shaft (3).

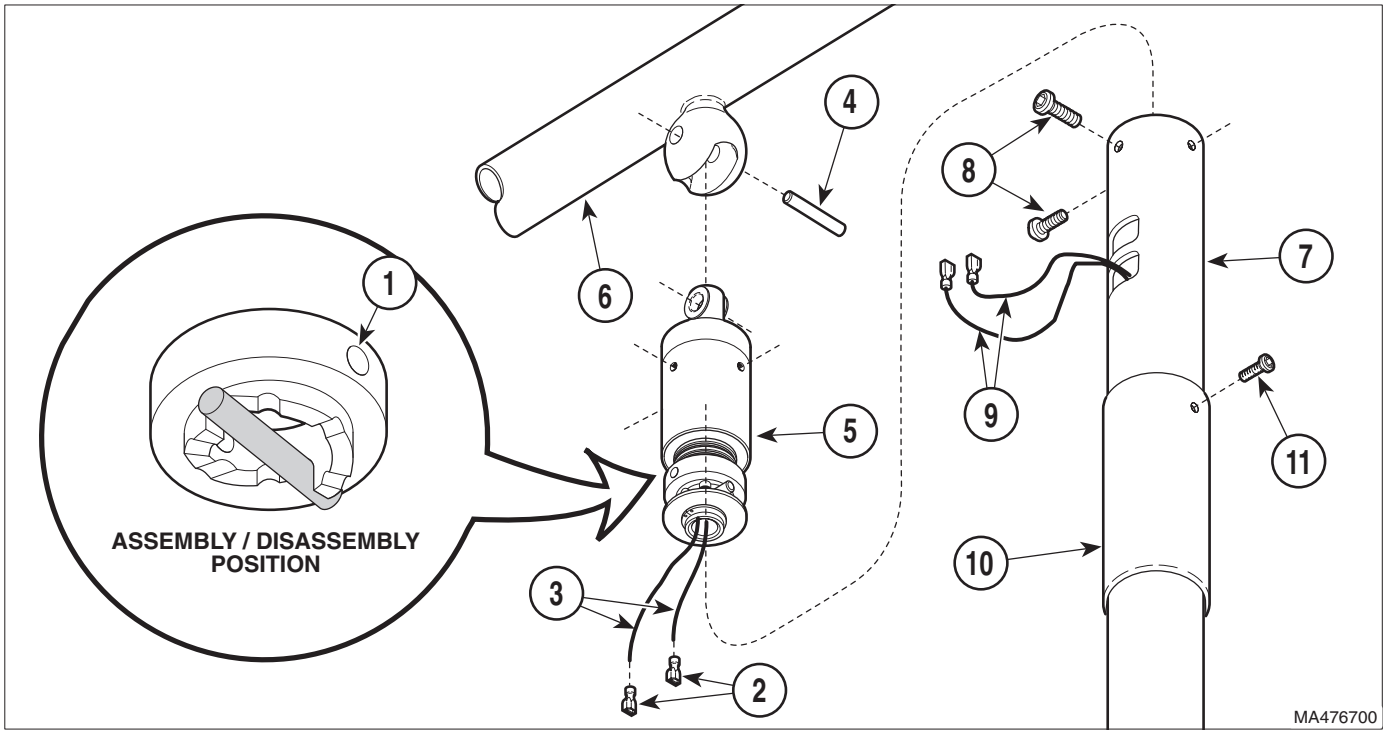

Figure 4-22. Ball Pivot Removal / Installation

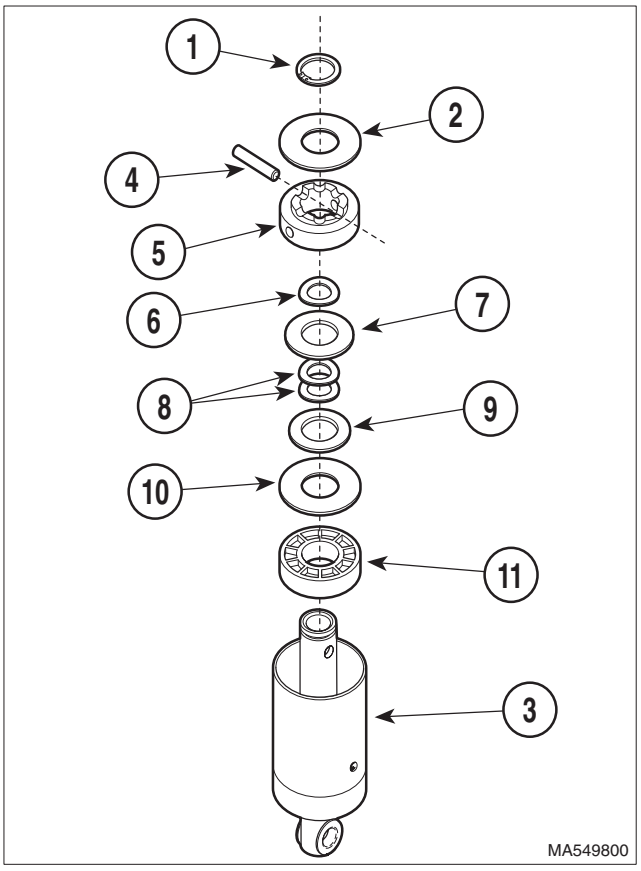

Figure 4-23. Ball Pivot Disassembly / Assembly

(3) Remove ball pivot cam (5), wave washer (6), washer (7), two wave washers (8), thrust washer (9), washer (10), and ball pivot bearing (11) from ball pivot shaft (3).

NOTE
If it is necessary to remove the ball pivot stop, perform remaining steps.

One method of removing flange bearings is to use vise grips to rotate flange bearings and loosen them and then use a screwdriver to pry them out.

(4) Remove two flange bearings (1, Figure 4-24) from ball pivot shaft (2).

(5) Remove ball pivot brake (3), ball pivot housing (4), and ball pivot stop (5) from ball pivot shaft (2).

(6) If broken, remove groove pin (6).

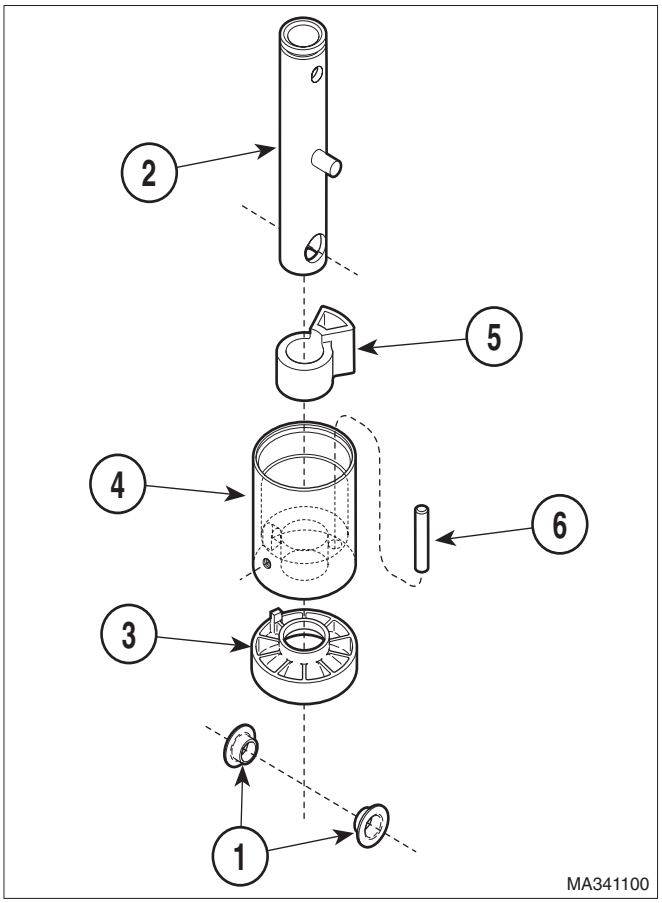

Figure 4-24. Ball Pivot Stop Removal / Installation

C. Assembly

NOTE
New groove pins should be used anytime they are removed.

(1) If removed, install groove pin (6, Figure 4-24)

NOTE
To install correctly, make sure raised portion of ball pivot stop (5) is facing toward top of ball pivot shaft (2). Also, make sure the concave of ball pivot brake (3) faces the ball pivot.

(2) Install ball pivot stop (5), ball pivot housing (4), and ball pivot brake (3) on ball pivot shaft (2).

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(3) Install two flange bearings (1) on ball pivot shaft (2).

NOTE
To install correctly, make sure teflon side of thrust washer (9, Figure 4-23) is placed against washer (10).

(4) Install ball pivot bearing (11, Figure 4-23), washer (10), thrust washer (9), two wave washers (8), washer (7), wave washer (6), and ball pivot cam (5) on ball pivot shaft (3).

NOTE
New groove pins should be used anytime they are removed.

(5) Using a hammer and punch, drive groove pin (4) into ball pivot shaft (3).

(6) Install washer (2) on ball pivot shaft (3) and secure with retaining ring (1).

D. Installation

EQUIPMENT ALERT
When feeding wires (3, Figure 4-21) thru ball pivot assembly (5), be sure to get one wire on each side of the pins that go thru the ball pivot shaft. Failure to do so could result in the wires being severed.

(1) Feed wires (3, Figure 4-22) through ball pivot assembly (5)

(2) Strip insulation from wires (3); then install one quick disconnect (2) on each wire.

(3) Position ball pivot assembly (5) on cross tube (6). Then, insert a punch through pin hole.

EQUIPMENT ALERT
Use 5/16" punch or similar device to divert the wires while the groove pin is being installed. Failure to do so will result in wires being sheared off.

NOTE
When installing groove pin (4), be sure to insert the non-grooved end of the pin into the ball pivot assembly first. New groove pins should be used any time they are removed.

(4) Using punch as a wire diverter to keep wires from being sheared off, install groove pin (4) to secure cross tube / lighthead (6) to ball pivot assembly (5).

WARNING
Make sure screws (8) are installed correctly. Failure to do so could allow the light assembly to fall, striking and injuring a patient or staff member.

NOTE
There are three screw holes in ball pivot assembly (5); two holes are larger and have coarser threads. Use these two holes to secure cross tube with screws (8). The other hole is for securing ball pivot sleeve (10) with screw (11).

(5) Insert ball pivot assembly (5) into vertical tube (7) and secure with two screws (8), making sure wires (3) are fed down into vertical tube.

(6) Connect two wires (3) to two wires (9).

(7) Adjust ball pivot joint tension (Refer to para 4.16).

(8) Slide ball pivot sleeve (10) up into position and secure with screw (11).

(9) Connect electrical power to unit.

4.18 Lamp Tube Brake Adjustment

A. Adjustment

(1) Slide pivot sleeve (1, Figure 4-25) up out of way.

(2) Remove two screws (2) from cross tube (3); then separate lamp tube (4) from cross tube as far as wiring will allow.

(3) Loosen jam nut (5).

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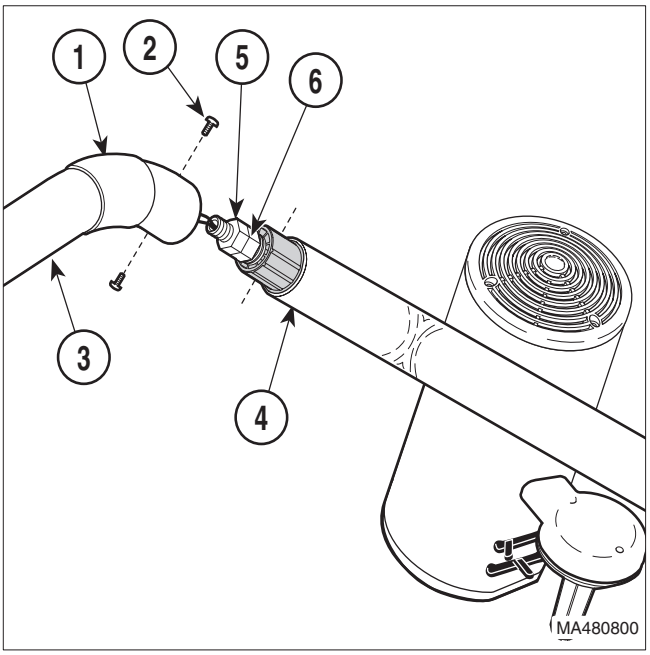

Figure 4-25. Lamp Tube Brake Adjustment

(4) Adjust nut (6) to tighten or loosen braking tension.

(5) While holding nut (6) stationary, tighten jam nut (5) to 20 to 30 ft.-lbs (27.1 to 40.7 N•m).

(6) Install lamp tube (4) in cross tube (3) and secure with two screws (2).

(7) Check brake adjustment. The lamp tube brake should hold when released and not allow the lamp tube to drift on its own, but also should not be too stiff as to prevent easy positioning by operator. If possible, consult the operator(s) on their desired brake tension setting.

(8) Repeat steps 2 through 7 until satisfactory brake adjustment is achieved.

(9) Slide pivot sleeve (1) down over pivot joint, making sure the indentations of the pivot sleeve seat on screws.

4.19 Lighthead Brake Adjustment

A. Adjustment

(1) Remove two screws (1, Figure 4-26) from lamp tube (2); then separate lamp tube (2) from lighthead (3) as far as wiring will allow.

(2) Loosen jam nut (4).

(3) Adjust nut (5) to tighten or loosen braking tension.

(4) While holding nut (5) stationary, tighten jam nut (4) to 20 to 30 ft.-lbs (27.1 to 40.7 N•m).

WARNING
Make sure screws (1) are installed correctly. Failure to do so could allow the lighthead to fall, striking and injuring a patient or staff member.

(5) Install lighthead (3) in lamp tube (2) and secure with two screws (1).

(6) Check brake adjustment. The lighthead brake should hold when released and not allow the lighthead to drift on its own, but also should not be too stiff as to prevent easy positioning by operator. If possible, consult the operator(s) on their desired brake setting.

(7) Repeat steps 1 through 6 until satisfactory brake adjustment is achieved.

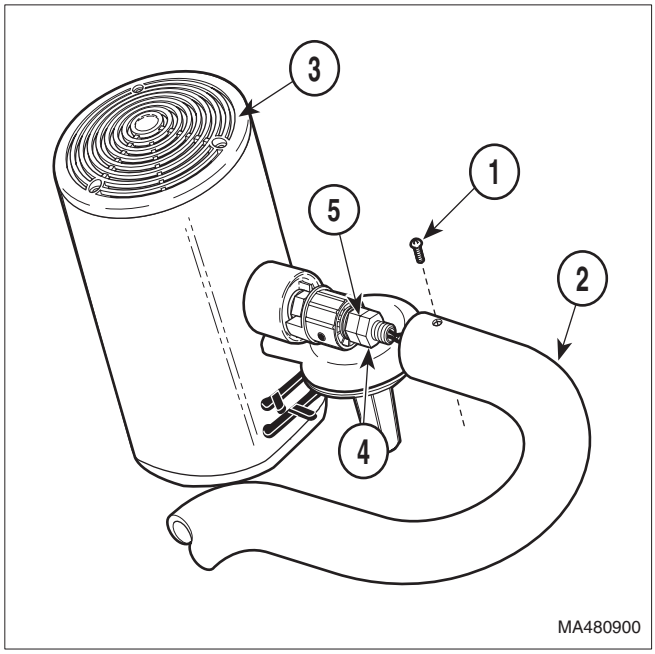

Figure 4-26. Lighthead Brake Adjustment

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4.20 Lighthead Pivot Bearing Stop Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers / shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove two screws (1, Figure 4-27) and partially separate lighthead (2) from lamp tube (3).

(3) Disconnect two wires (4) from two wires (5) and remove lighthead (2).

(4) Remove nut (6), nut (7), three washers (8), wave washer (9), washer (10), wave washer (11), and pivot bearing stop (12) from shaft (13).

(5) If necessary, remove wave washer (14) from shaft (13).

B. Installation

(1) If removed, install wave washer (14) on shaft (13).

(2) Install pivot bearing stop (12), wave washer (11), washer (10), wave washer (9), three washers (8), nut (7), and nut (6) on shaft (13). Do not tighten nuts (6 and 7) at this time.

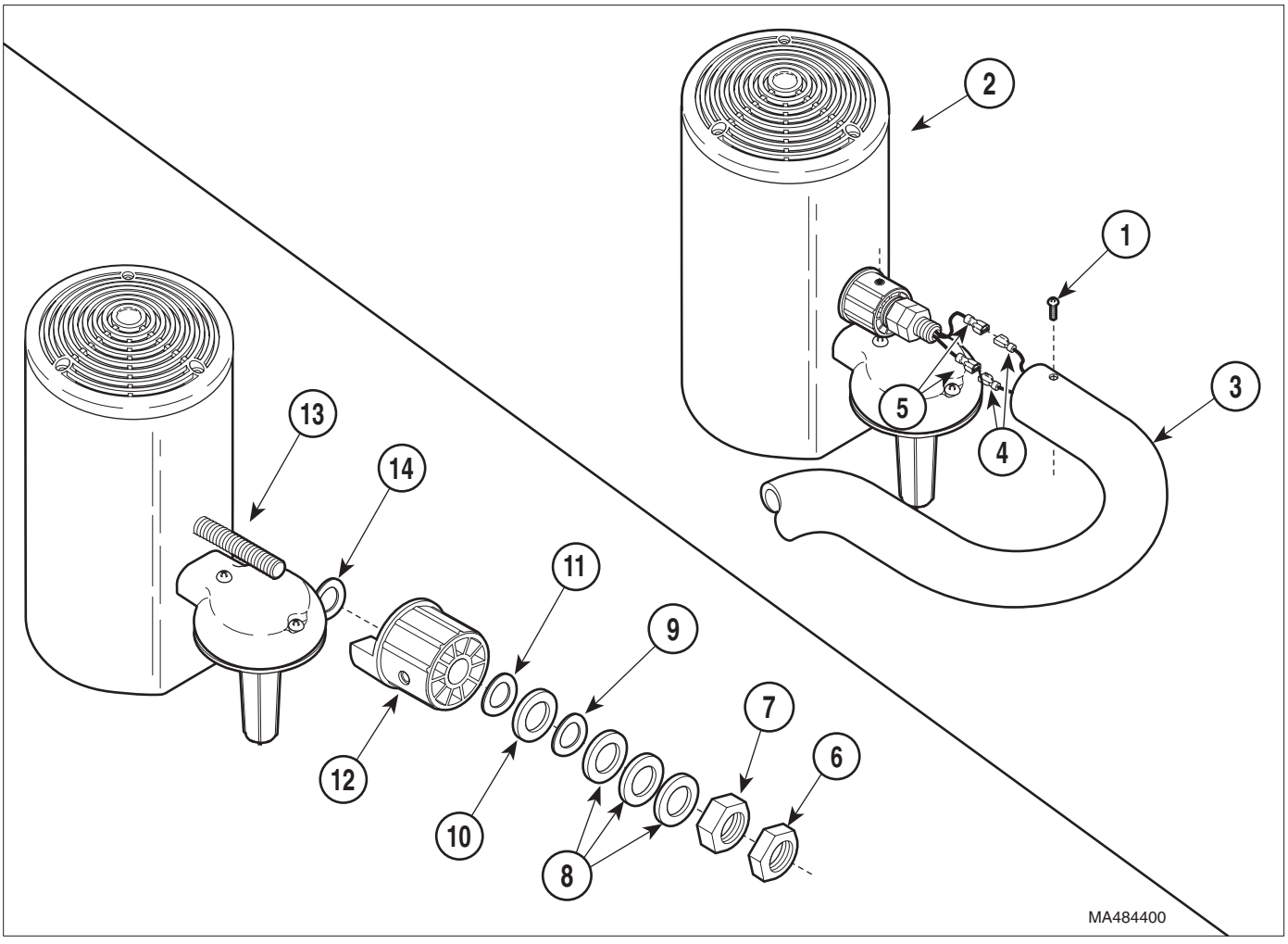

Figure 4-27. Lighthead Pivot Bearing Stop Removal / Installation

(3) Adjust nut (7) to tighten or loosen braking tension.

(4) While holding nut (7) stationary, tighten jam nut (6) to 20 to 30 ft.-lbs (27.1 to 40.7 N•m).

(5) Connect two wires (5) to two wires (4).

WARNING
Make sure screws (1) are installed correctly. Failure to do so could allow the lighthead assembly to fall, striking and injuring a patient or staff member.

(6) Insert lighthead (2) in lamp tube (3) and secure with two screws (1).

(7) Check brake adjustment. The lighthead brake should hold when released and not allow the lighthead to drift down on its own, but also should not be too stiff as to prevent easy positioning by the operator. If possible, consult the operator(s) on their desired brake setting.

(8) Repeat steps 3 thru 7 as necessary until desired braking action is attained.

(9) Connect electrical power to unit.

4.21 Caster Removal / Installation

A. Removal

EQUIPMENT ALERT
Be sure to support lighthead and cross tube when laying unit on its side. Failure to do so may result in damage to the unit.

(1) Lay unit on its side

(2) Remove caster (1, Figure 4-28) from base (2) by pulling outward.

B. Installation

NOTE
Always install one non-locking caster between the two locking casters

(1) Insert caster (1) into base (2) until it locks into place.

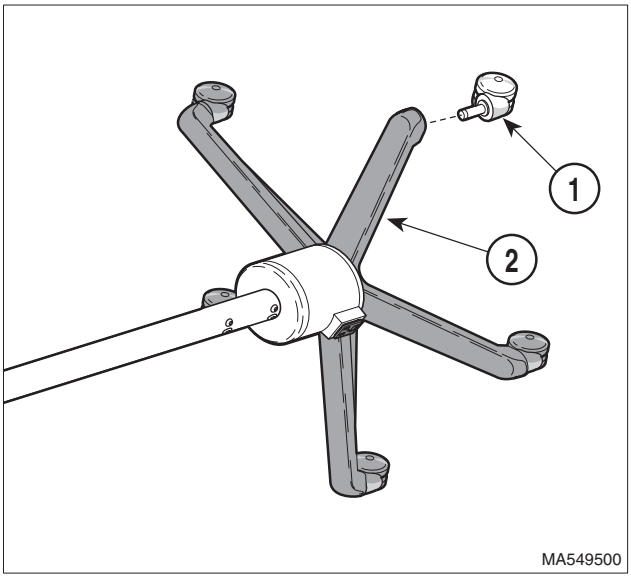

Figure 4-28. Caster Removal / Installation

(2) Stand unit upright.

4.22 Lamp Tube Pivot Stop Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove two screws (1, Figure 4-29) and partially separate lighthead (2) from lamp tube (3).

(3) Disconnect two wires (4) from two wires (5) and remove lighthead (2).

(4) Slide pivot sleeve (6) up out of way.

(5) Remove two screws (7) and separate lamp tube (3) from cross tube (8).

(6) Cut quick disconnect terminals from wires (4).

(7) Pull two wires (4) out of lamp tube (3).

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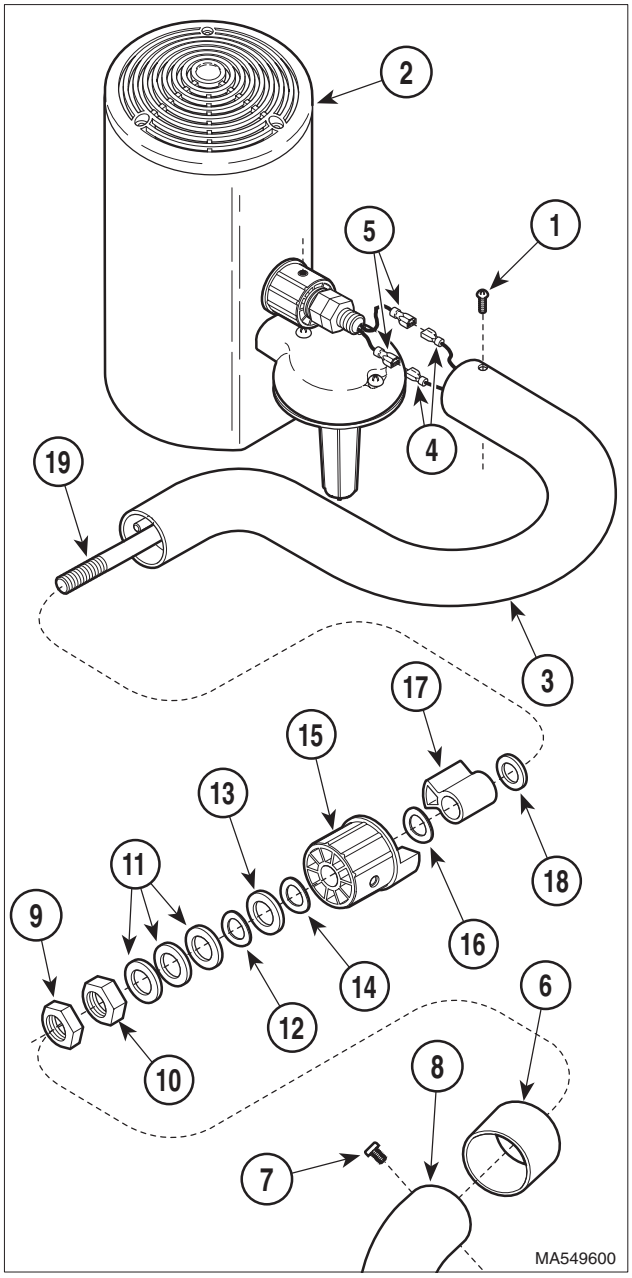

Figure 4-29. Lamp Tube Pivot Stop Removal / Installation

(8) Remove nut (9), nut (10), three washers (11), wave washer (12), washer (13), wave washer (14), pivot bearing (15), wave washer (16), lamp tube pivot stop (17) and flat washer (18) from shaft (19).

B. Installation

(1) Install flat washer (18), lamp tube pivot stop (17), wave washer (16), pivot bearing (15), wave washer (14), washer (13), wave washer (12), three washers (11), nut (10), and nut (9) on shaft (19). Do not tighten nuts at this time.

(2) Feed two wires (4) thru lamp tube (3). Strip insulation from wires and then install two quick disconnects on two wires (4).

(3) Connect two wires (4) to two wires (5).

(4) Insert lighthead (2) into lamp tube (3) and secure with two screws (1).

(5) Adjust nut (10) to tighten or loosen braking tension.

(6) While holding nut (10) stationary, tighten jam nut (9) to 20 to 30 ft.-lbs (27.1 to 40.7 N•m).

WARNING
Make sure screws (7) are installed correctly. Failure to do so could allow the faceplate assembly to fall, striking and injuring a patient or staff member.

(7) Insert lamp tube (3) into cross tube (8) and secure with two screws (7).

(8) Check brake adjustment. The lamp tube brake should hold when released and not allow the lamp tube to drift on its own, but also should not be too stiff as to prevent easy positioning by operator. If possible, consult the operator(s) on their desired brake setting.

(9) Repeat steps 5 thru 8 as necessary until desired braking action is attained.

(10) Slide pivot sleeve (6) down over pivot joint, making sure the indentations of the pivot sleeve seats on screws.

(11) Connect electrical power to unit.

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4.23 Fuse Holder Removal / Installation

A. Removal

WARNING
Always disconnect electrical power to the unit before removing any of the unit's covers/shrouds or making any repairs to prevent the possibility of electrical shock. Failure to comply with these instructions could result in severe personal injury or death.

(1) Disconnect electrical power to unit.

(2) Remove cross tube counterbalance assembly. (Refer to para 4.4)

(3) Remove transformer housing assembly. Refer to para 4.5 (Removal - Steps 1 thru 5)

(4) Push in on fuse cap (1, Figure 4-30) and rotate 1/4 turn in the counterclockwise direction; then pull fuse cap from fuse holder (2).

(5) Pull fuse (3) out of fuse cap (1).

NOTE
Using matchmarks will help align the bottom plate with the mounting holes in the transformer housing during assembly.

(6) Place matchmarks on bottom plate (4) and transformer housing (5).

(7) Remove four screws (6) and bottom plate (4) from transformer housing (5).

(8) Disconnect two wires (7) from terminals of fuse holder (2).

(9) Remove nut (8), washer (9) and fuse holder (2) from transformer housing assembly (5).

B. Installation

(1) Push fuse holder (2) through hole in housing assembly (5) and secure with washer (9) and nut (8).

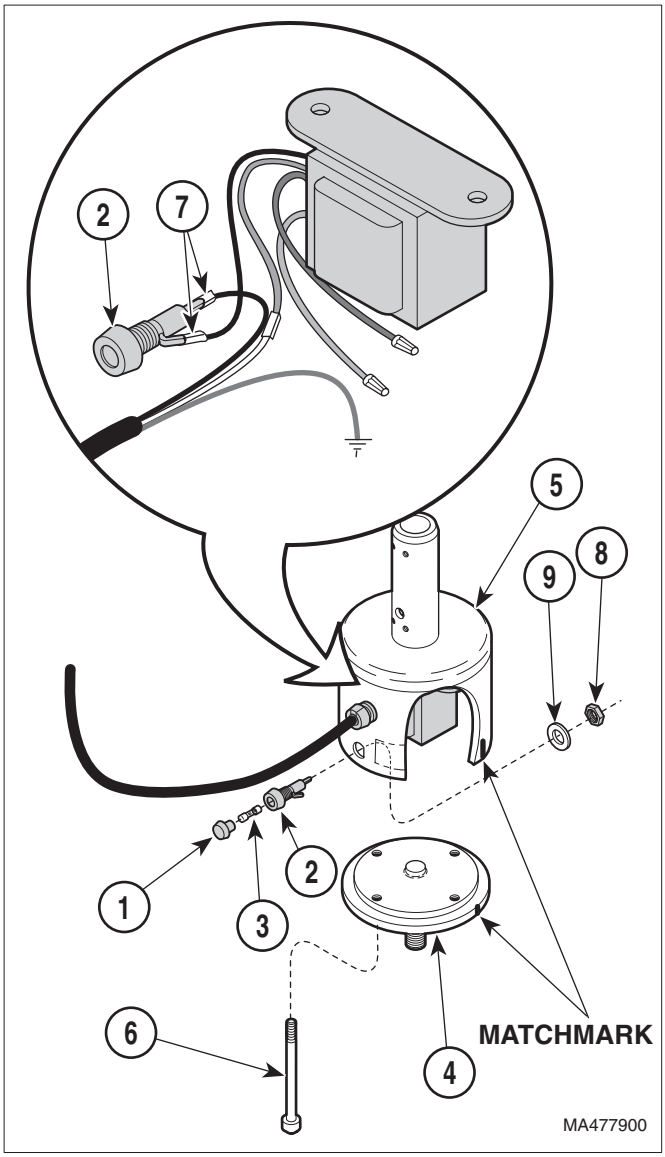

Figure 4-30. Fuse Holder Removal / Installation

(2) Connect two wires (7) to terminals of fuse holder (2).

(3) Align matchmarks and install bottom plate (4) on transformer housing (5) and secure with four screws (6).

(4) Insert fuse (3) into fuse cap (1); then push fuse cap into fuse holder (2) and rotate 1/4 turn in the clockwise direction.

(5) Install transformer housing assembly. Refer to para 4.5 (Installation - Steps 6 thru 9)

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(6) Install cross tube counterbalance assembly. (Refer to para 4.4)

(7) Connect electrical power to unit

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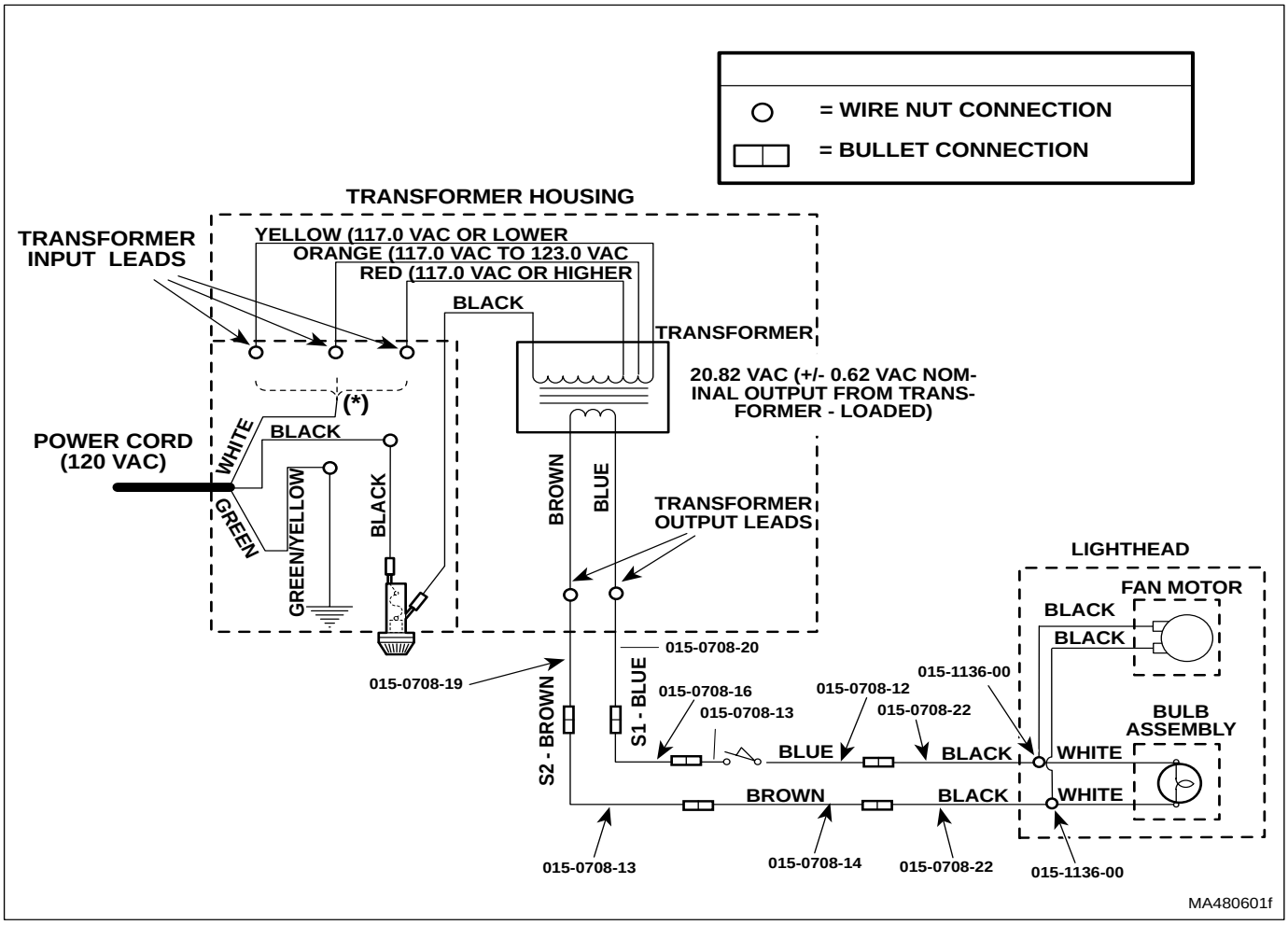
SECTION V
SCHEMATICS AND DIAGRAMS

5.1 Electrical Schematics / Wiring Diagrams

Figures 5-1 and 5-2 illustrate the current flow and wiring connections between the electrical components of the specified models of 354 Mobile Lighting Systems.



(*) NOTE

Select transformer input tap by measuring the input voltage. Then connect the power lead (white wire) to one of the following according to the input voltage measured:

117.0 VAC or lower - Use the YELLOW lead
117.1 VAC to 123.0 VAC - Use the ORANGE lead
123.1 VAC or higher - Use the RED lead

Figure 5-1. Electrical Schematic / Wiring Diagram 354-005 & 354-011

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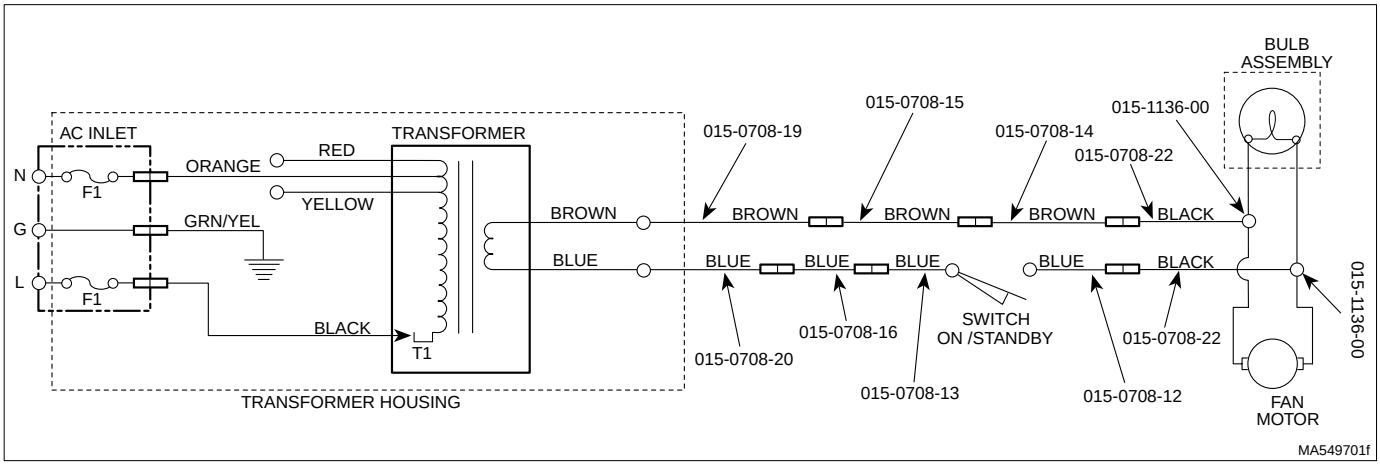
SECTION V
SCHEMATICS AND DIAGRAMS



(*) NOTE

Select transformer input tap by measuring the input voltage. Then connect the power lead (white wire) to one of the following according to the input voltage measured:

117.0 VAC or lower - Use the YELLOW lead
117.1 VAC to 123.0 VAC - Use the ORANGE lead
123.1 VAC or higher - Use the RED lead

Figure 5-2. Electrical Schematic / Wiring Diagram
354-022 & 354-023

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SECTION VI
PARTS LIST

6.1 Introduction

The illustrated parts list provides information for identifying and ordering the parts necessary to maintain the unit in peak operating condition. Refer to paragraph 1.5 for parts ordering information.

6.2 Description of Columns

The Item column of the parts list gives a component its own unique number. The same number is given to the component in the parts illustration. This allows a part number of a component to be found if the technician can visually spot the part on the illustration. The technician simply finds the component in question on the illustration and notes the item number of that component. Then, he finds that item number in the parts list. The row corresponding to the item number gives the technician the part number, a description of the component, and quantity of parts per subassembly. Also, if a part number is known, the location of that component can be determined by looking for the item number of the component on the illustration.

The Part No. column lists the MIDMARK part number for that component.

The Description column provides a physical description of the component.

The Qty. column lists the number of units of a particular component that is required for the subassembly. The letters “AR” denote “as required” when quantities of a particular component cannot be determined, such as: adhesive.

Bullets { • } in the Part No. column and the Description column show the indenture level of a component. If a component does not have a bullet, it is a main component of that illustration. If a component has a bullet, it is a subcomponent of the next component listed higher in the parts list than itself that does not have a bullet. Likewise, if a component has two bullets, it is a subcomponent of the next component listed higher in the parts list than itself that has only one bullet.

6.3 Torque Specifications and Important Assembly Notes

When specific assembly torque specifications, measurements, or procedures have been identified, by our engineering department, as required to assure proper function of the unit, those torque specifications measurements, and procedures will be noted on the parts illustrations. Adherence to these requirements is essential.

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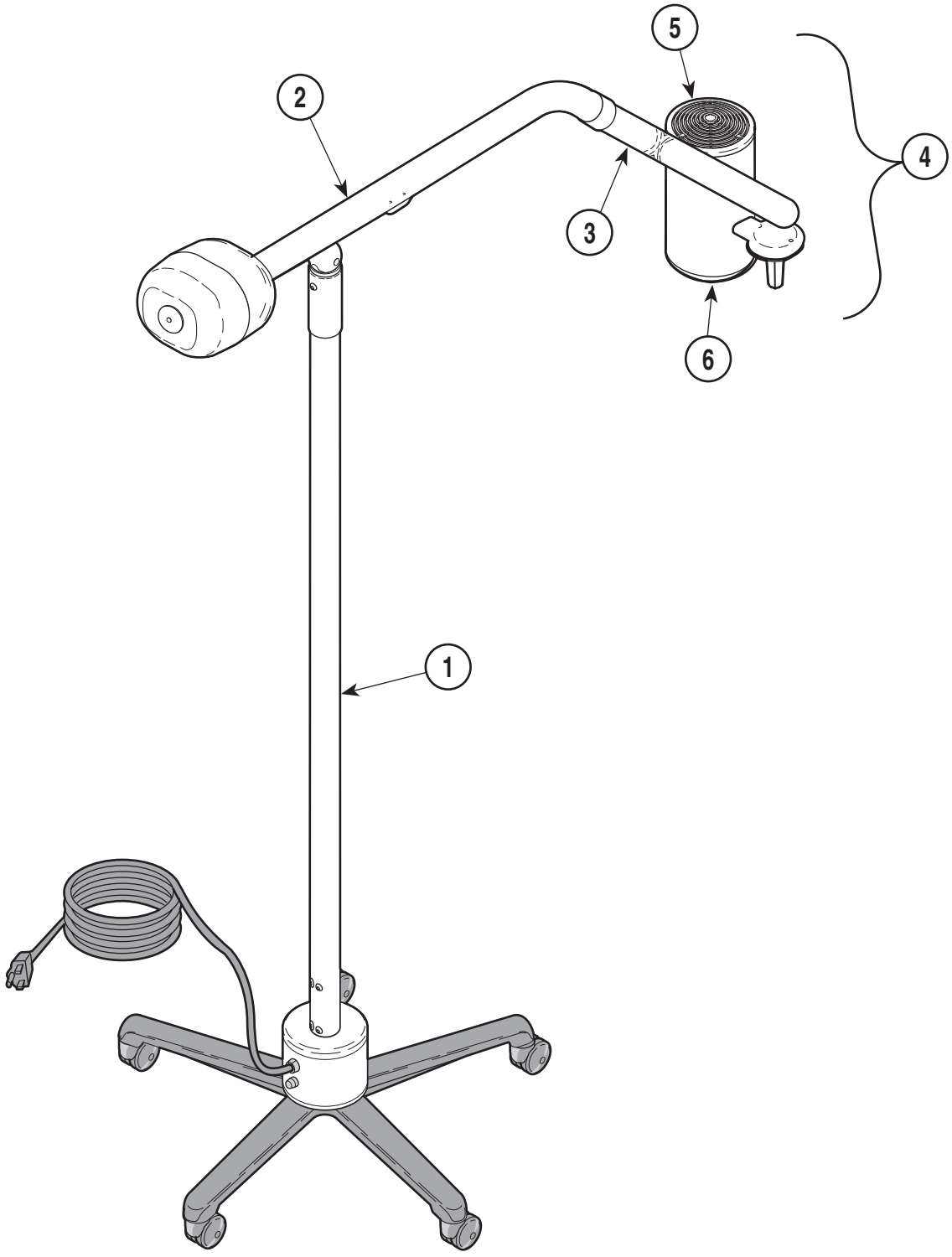
Ritter 354
Mobile Light System



MA

Item	Part No.	Description	Page
	354-005	120 V. Ritter 354 Mobile Light System'	
	354-022	(Includes Items 1 thru 7)	6-2
1	•	• Base and Vertical Tube Assembly	6-4.*
2	•	• Cross Tube Assembly	6-5.*
3	•	• Lamp Tube Assembly	6-6
4	•	• Lighthead Assembly (Includes Items 5 and 6)	6-7.*
5	• •	• • Bulb Carriage Assembly	6-8
6	• •	• • Optic Assembly	6-9.*

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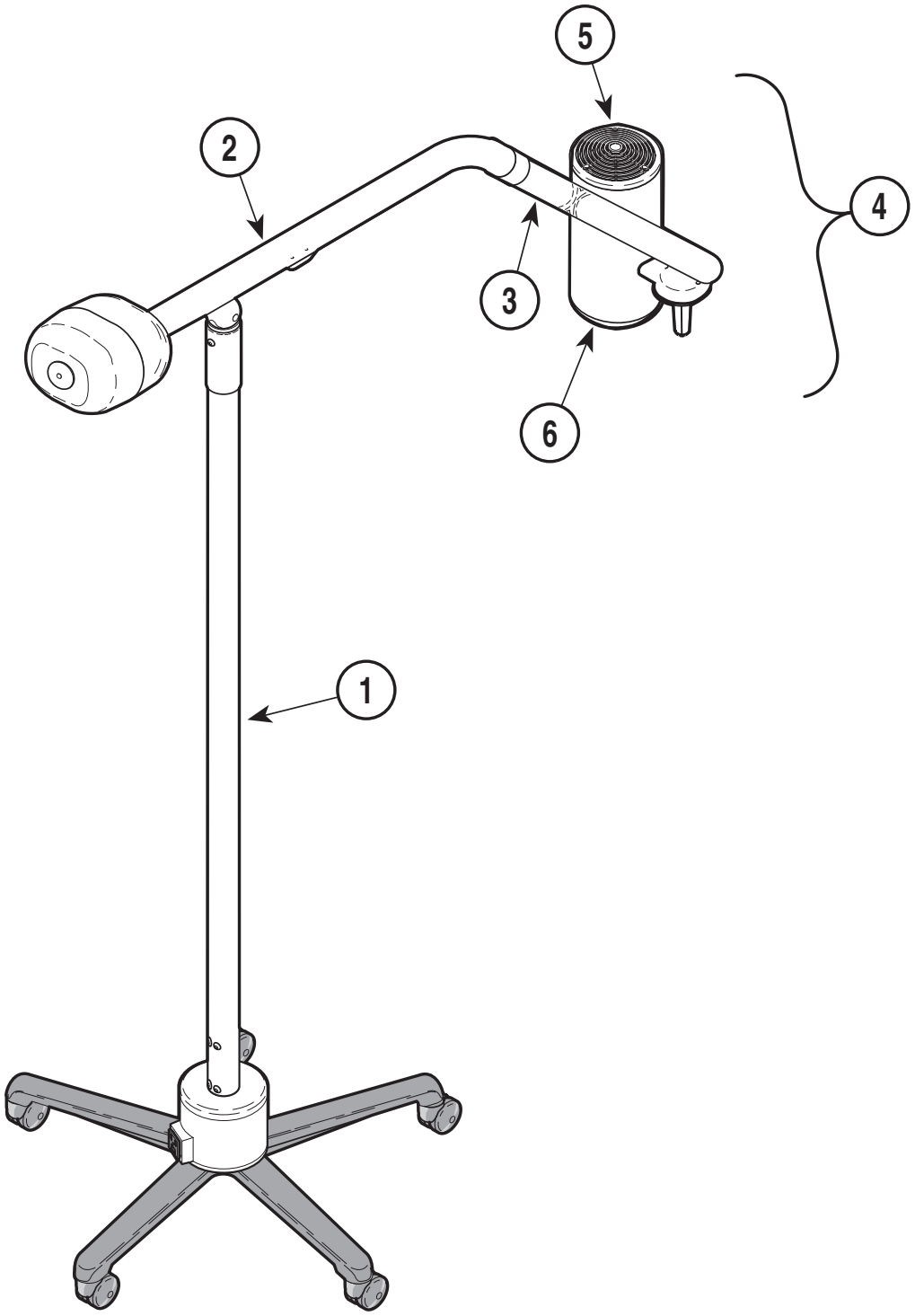
Midmark 354
Mobile Light System



MA549903

Item	Part No.	Description	Page
	354-011	120 V. Midmark 354 Mobile Light System'	
	354-022	(Includes Items 1 thru 7)	6-3
1	•	• Base and Vertical Tube Assembly	6-4.*
2	•	• Cross Tube Assembly	6-5.*
3	•	• Lamp Tube Assembly	6-6
4	•	• Lighthead Assembly (Includes Items 5 and 6)	6-7.*
5	• •	• • Bulb Carriage Assembly	6-8
6	• •	• • Optic Assembly	6-9.*

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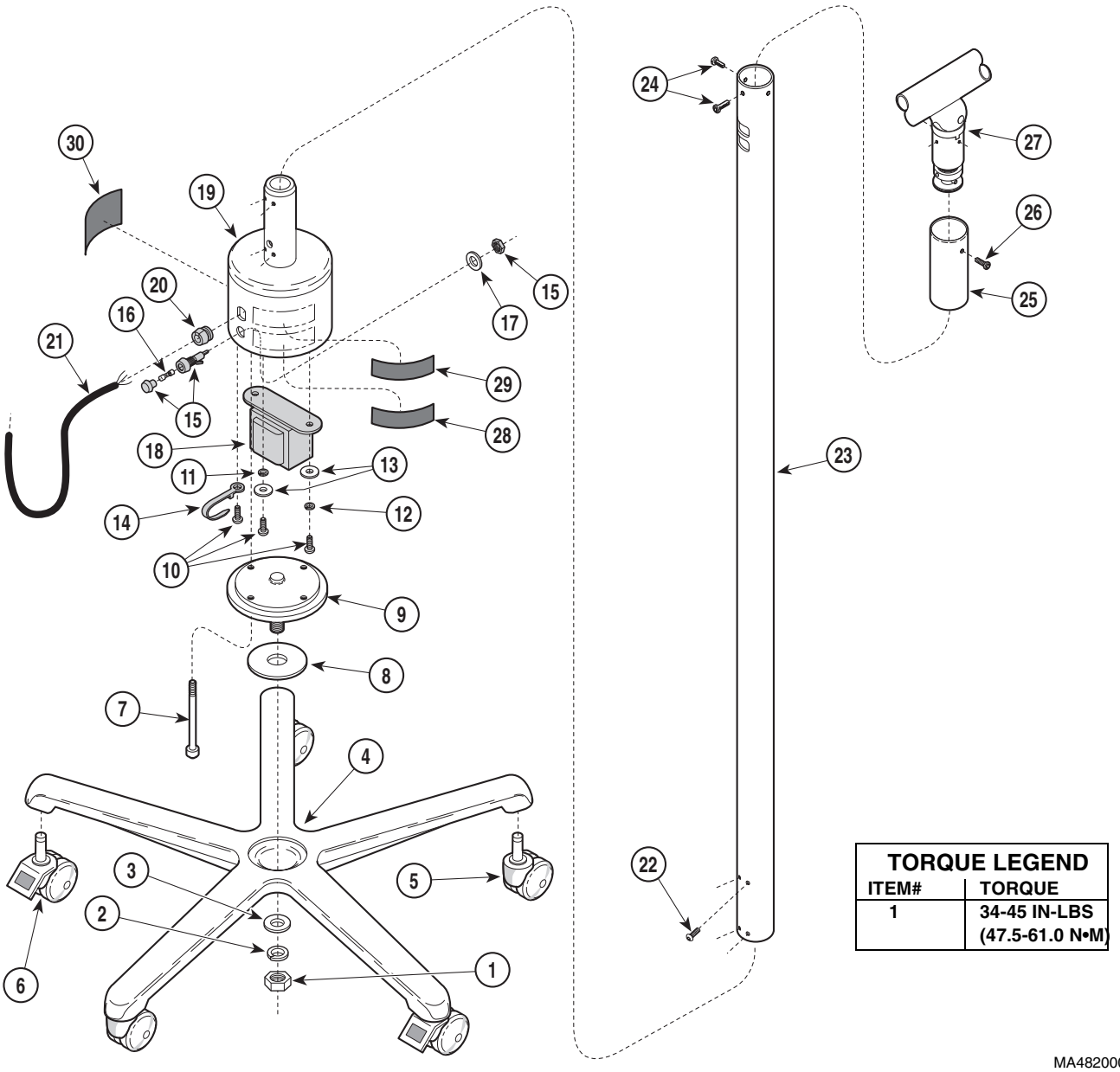
Base and Vertical Tube Assembly



TORQUE LEGEND	
ITEM#	TORQUE
1	34-45 IN-LBS (47.5-61.0 N•M)

MA482000

Used on units with Serial Numbers KR1000 & MC1000 thru Present

Item	Part No.	Description	Qty
	029-2066-01	Base and Vertical Tube Assembly ..... (Includes Items 1 thru 23)	1
1	• 041-0500-04	• Nut	1
2	• 045-0001-33	• Lockwasher	1
3	• 045-0001-62	• Washer	1
4	• 020-0175-00	• Base Casting	1
5	• 016-0730-01	• Twin Roller Caster	3
6	• 016-0730-00	• Twin Roller Caster(Lockable)	2
7	• 040-0250-147	• Screw	4
8	• 050-3829-00	• Spacer Disk	1
9	• 030-1087-00	• Bottom Plate Weldment	1
10	• 040-0010-47	• Screw	4
11	• 045-0001-31	• Lockwasher	1
12	• 045-0001-04	• Lockwasher	2
13	• 045-0001-00	• Washer	3
14	• 015-0017-00	• Cable Tie	1
15	• 015-0969-00	• Fuse Holder (Includes Nut)	1
16	• 015-0346-08	• Fuse (3 Amp.)	1
17	• 045-0001-107	• Washer	1
18	• 002-0606-00	• Transformer Replacement Kit	1
19	• 030-1084-00	• Top Plate Weldment	1
20	• 015-0002-00	• Snap Bushing	1
21	• 015-0066-13	• Power Cord	1
22	• 040-0010-131	• Screw	4
23	• 052-0315-00	• Vertical Tube	1
24	040-0010-131	Screw	2
25	053-0807-00	Ball Pivot Sleeve	1
26	040-0008-91	Screw	1
27		Cross Tube (Refer to “Cross Tube Assembly” Elsewhere)	Ref
28	061-0611-00	Fuse Replacement Label	1
29	561-0191-00	Electrical Shock Label	1
30	561-0318-00	UL / CUL Label	1

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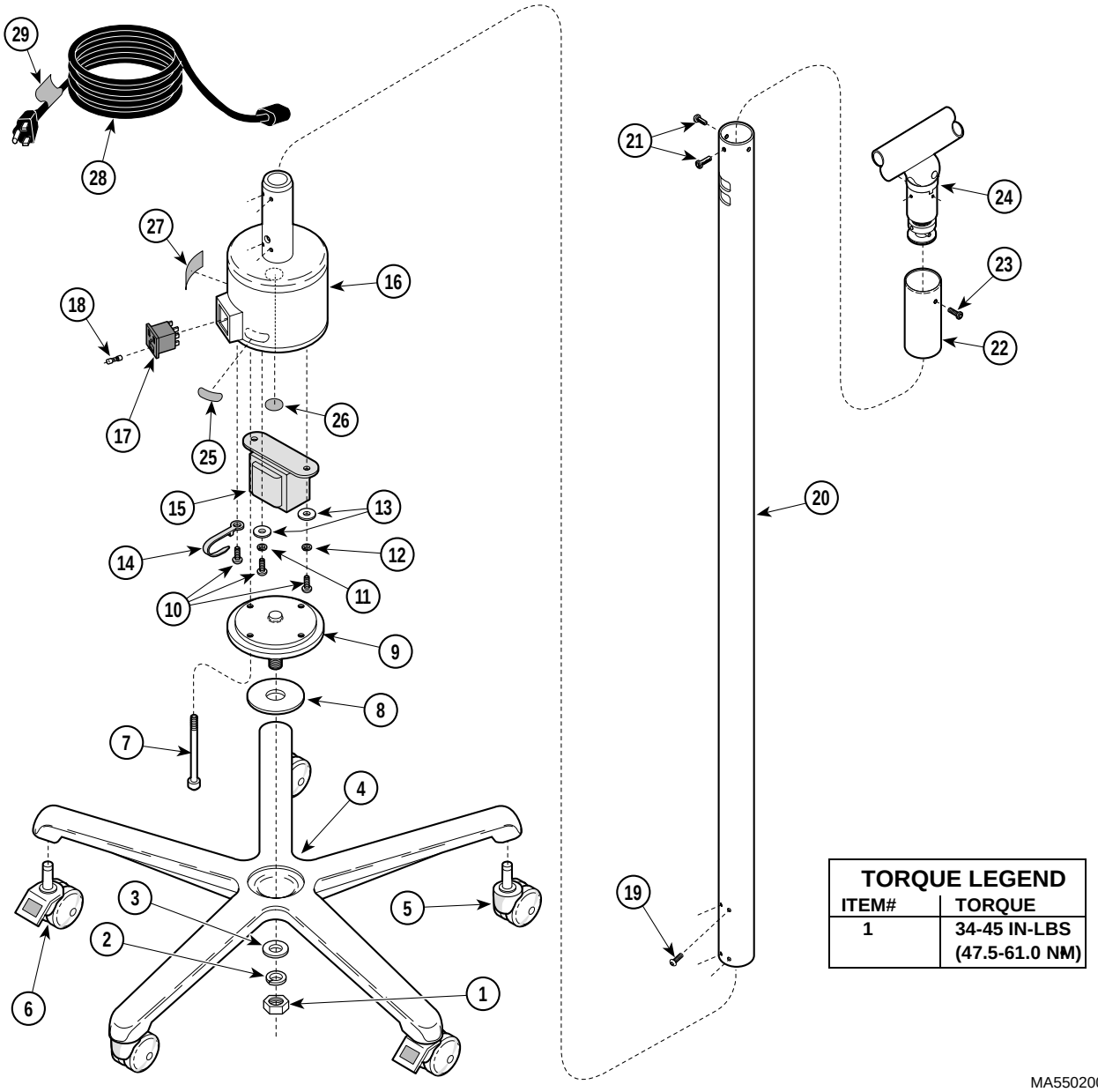
Base and Vertical Tube Assembly



TORQUE LEGEND	
ITEM#	TORQUE
1	34-45 IN-LBS (47.5-61.0 NM)

MA550200

Used on units with Serial Numbers MV1000 thru MV1059

Item	Part No.	Description	Qty
	029-2393-00	Base and Vertical Tube Assembly ..... (Includes Items 1 thru 20)	1
1	•041-0500-04	•Nut	1
2	•045-0001-33	•Lockwasher	1
3	•045-0001-62	•Washer	1
4	•020-0175-00	•Base Casting	1
5	•016-0730-01	•Twin Roller Caster	3
6	•016-0730-00	•Twin Roller Caster (Lockable)	2
7	•040-0250-147	•Screw	4
8	•050-3829-00	•Spacer Disk	1
9	•030-1087-00	•Bottom Plate Weldment	1
10	•040-0010-47	•Screw	4
11	•045-0001-31	•Lockwasher	1
12	•045-0001-04	•Lockwasher	2
13	•045-0001-00	•Washer	3
14	•015-0017-00	•Cable Tie	1
15	•002-0606-00	•Transformer Replacement Kit	1
16	•030-1239-00	•Top Plate Weldment	1
17	•015-1362-00	•AC Inlet, 2-Pole, Snap-in	1
18	•015-0346-29	•Fuse (1.6 Amp.)	1
19	•040-0010-131	•Screw	4
20	•052-0315-00	•Vertical Tube	1
21	040-0010-131	Screw	2
22	053-0807-00	Ball Pivot Sleeve	1
23	040-0008-91	Screw	1
24		Cross Tube (Refer to "Cross Tube Assembly" Elsewhere)	Ref
25	061-0744-00	Fuse Replacement Label	1
26	061-0653-00	Earth (Ground) Label	1
27	061-0747-00	CUS Label	1
28	015-1338-01	Power Cord	1
29	061-0743-00	Cord Tag	1

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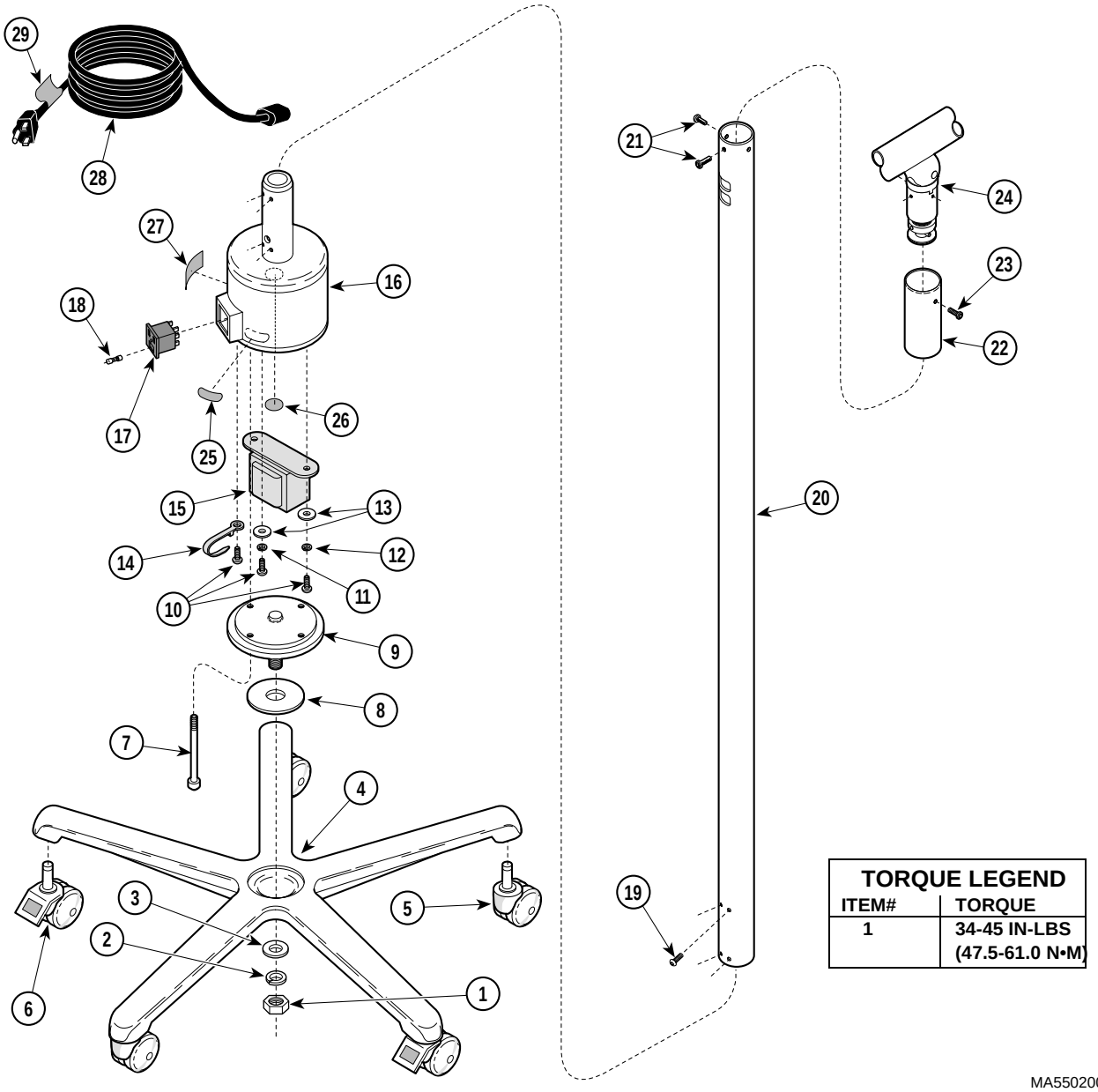
Base and Vertical Tube Assembly



TORQUE LEGEND	
ITEM#	TORQUE
1	34-45 IN-LBS (47.5-61.0 N•M)

MA550200

Used on units with Serial Numbers MV1060 thru Present

Item	Part No.	Description	Qty
	029-2393-00	Base and Vertical Tube Assembly ..... (Includes Items 1 thru 20)	1
1	• 041-0500-04	• Nut	1
2	• 045-0001-33	• Lockwasher	1
3	• 045-0001-62	• Washer	1
4	• 020-0175-00	• Base Casting	1
5	• 016-0730-01	• Twin Roller Caster	3
6	• 016-0730-00	• Twin Roller Caster (Lockable)	2
7	• 040-0250-147	• Screw	4
8	• 050-3829-00	• Spacer Disk	1
9	• 030-1087-00	• Bottom Plate Weldment	1
10	• 040-0010-47	• Screw	4
11	• 045-0001-31	• Lockwasher	1
12	• 045-0001-04	• Lockwasher	2
13	• 045-0001-00	• Washer	3
14	• 015-0017-00	• Cable Tie	1
15	• 002-0606-00	• Transformer Replacement Kit	1
16	• 030-1239-00	• Top Plate Weldment	1
17	• 015-1362-00	• AC Inlet, 2-Pole, Snap-in	1
18	• 015-0346-29	• Fuse (1.6 Amp.)	1
19	• 040-0010-131	• Screw	4
20	• 052-0315-00	• Vertical Tube	1
21	040-0010-131	Screw	2
22	053-0807-00	Ball Pivot Sleeve	1
23	040-0010-124	Screw	1
24		Cross Tube (Refer to “Cross Tube Assembly” Elsewhere)	Ref
25	061-0744-00	Fuse Replacement Label	1
26	061-0653-00	Earth (Ground) Label	1
27	061-0747-00	CUS Label	1
28	015-1338-01	Power Cord	1
29	061-0743-00	Cord Tag	1

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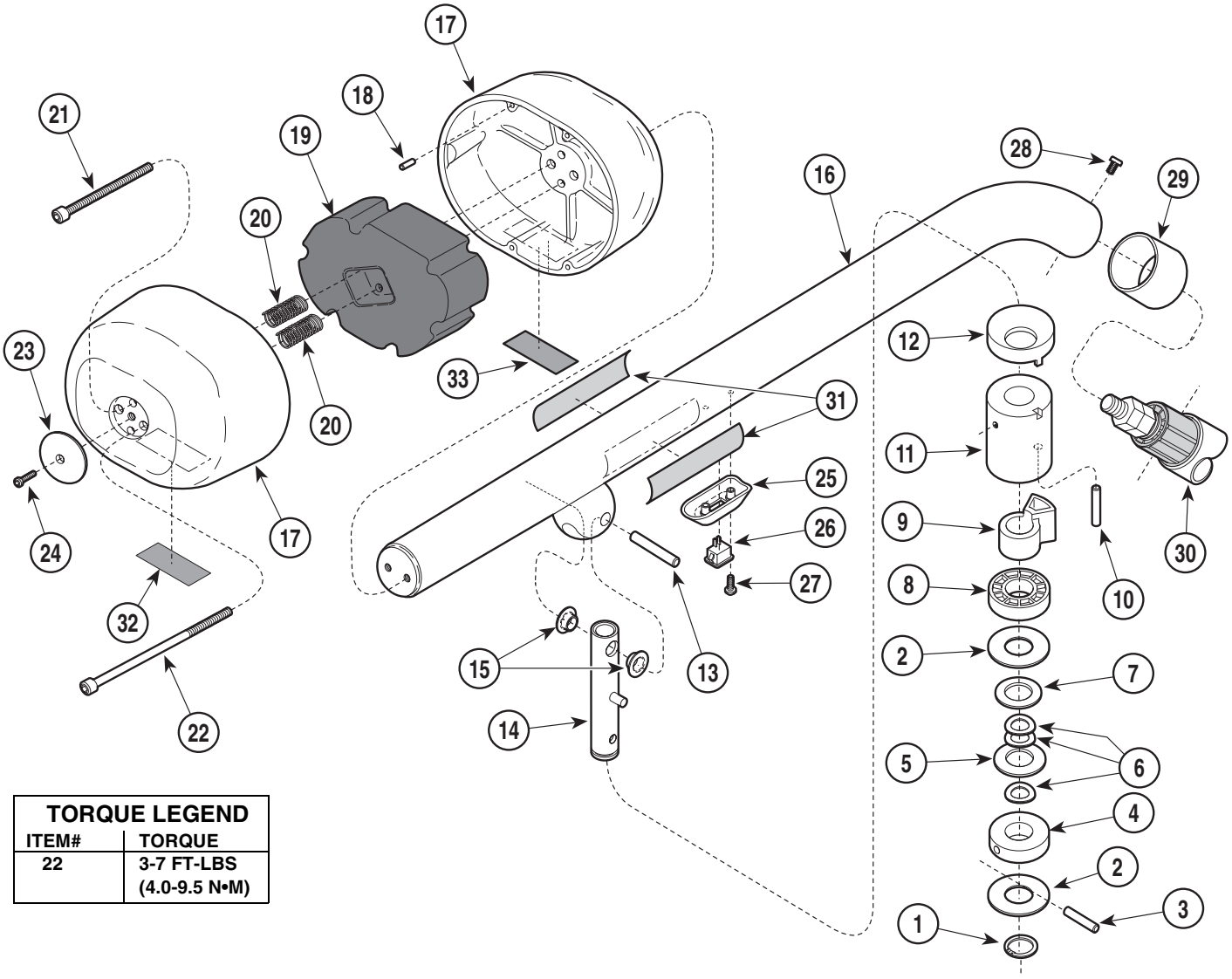
Cross Tube Assembly



TORQUE LEGEND	
ITEM#	TORQUE
22	3-7 FT-LBS (4.0-9.5 N•M)

MA482100

Used on units with Serial Numbers KR1000 thru KR1021

Item	Part No.	Description	Qty
	029-2044-00	Cross Tube Assembly (Includes Items 1 thru 22)	1
1	• 042-0101-05	• Retaining Ring	1
2	• 045-0001-111	• Washer	2
3	• 042-0157-01	• Groove Pin	1
4	• 057-0414-00	• Ball Pivot Cam	1
5	• 045-0001-112	• Washer	1
6	• 045-0001-110	• Wave Washer	3
7	• 016-0671-00	• DU Thrust Washer	1
8	• 053-0800-00	• Ball Pivot Bearing	1
9	• 002-0562-00	• Ball Pivot Stop Kit (Incl. Items 3 & 15)	1
10	• 042-0157-00	• Groove Pin	1
11	• 057-0413-00	• Ball Pivot Housing	1
12	• 053-0798-00	• Ball Pivot Brake	1
13	• 042-0157-03	• Groove Pin	1
14	• 002-0620-00	• Ball Pivot Shaft Weldment Kit	1
15	• 016-0392-07	• DU Flange Bearing	2
16	• 002-0620-00	• Cross Tube Weldment Kit	1
17	• 020-0168-00	• Ballast Housing	2
18	• 042-0157-04	• Groove Pin	4
19	• 020-0169-00	• Ballast	1
20	• 525-0024-11	• Spring	3
21	• 040-0250-144	• Screw	1
22	• 040-0312-57	• Screw	2
23	053-0810-00	Housing Cap	1
24	040-0010-70	Screw	1
25	053-0812-00	Switch Bezel	1
26	015-1086-00	Rocker Switch	1
27	040-0006-80	Screw	2
28	040-0010-131	Screw	2
29	053-0802-00	Common Pivot Sleeve	1
30		Lamp Tube (Refer to “Lamp Tube Assembly” Elsewhere)	Ref.
31	061-0708-00	Ritter 354 Model Label	2
32		Serial Number Label	Ref.
33	561-0201-00	Flammable Anesthetics Label	1

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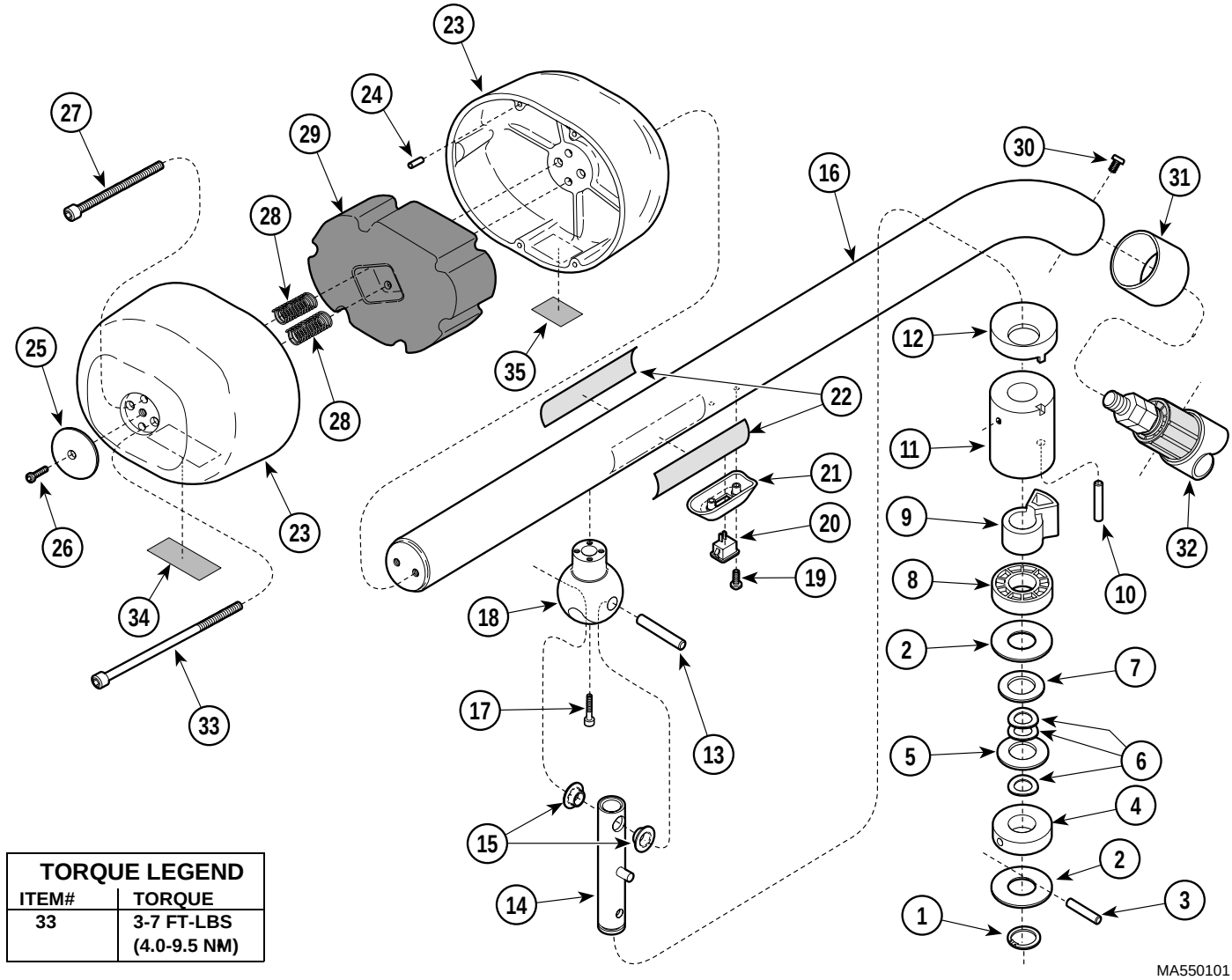
Cross Tube Assembly



MA550101

TORQUE LEGEND	
ITEM#	TORQUE
33	3-7 FT-LBS (4.0-9.5 NM)

Used on units with Serial Numbers KR1022, MC1000, thru Present & MV1000 thru MV1059

Item	Part No.	Description	Qty
	002-0617-00	Cross Tube Assembly (Includes Items 1 thru 22)	1
1	•042-0101-05	•Retaining Ring	1
2	•045-0001-111	•Washer	2
3	•042-0157-01	•Groove Pin	1
4	•057-0414-00	•Ball Pivot Cam	1
5	•045-0001-112	•Washer	1
6	•045-0001-110	•Wave Washer	4
7	•016-0671-00	•DU Thrust Washer	1
8	•053-0800-00	•Ball Pivot Bearing	1
9	•002-0562-00	•Ball Pivot Stop Kit (Incl. item 3 & 15)	1
10	•042-0157-00	•Groove Pin	1
11	•057-0413-00	•Ball Pivot Housing	1
12	•053-0798-00	•Ball Pivot Brake	1
13	•042-0157-03	•Groove Pin ***(Not Reusable)***	1
14	•030-1074-00	•Ball Pivot Shaft Weldment	1
15	•016-0392-07	•DU Flange Bearing	2
16	•002-0620-00	•Cross Tube Weldment Kit (Incl. 18)	1
17	•118653	•Screw (Apply Loctite #042-0025-00)	4
18	•	•Ball Pivot (Part of Item 16)	1
19	•040-0006-80	•Screw	2
20	•015-1086-00	•Rocker Switch	1
21	•053-0812-00	•Switch Bezel	1
22	•061-0754-00	•Ritter 354 Model Label	2
	•061-0732-00	•Midmark 354 Model Label	2
23	020-0168-00	Ballast Housing	2
24	042-0157-04	Groove Pin	4
25	053-0810-00	Housing Cap	1
26	040-0010-12	Screw	1
27	040-0250-144	Screw	1
28	525-0024-11	Spring	3
29	020-0169-00	Ballast	1
30	040-0010-131	Screw	2
31	053-0802-00	Common Pivot Sleeve	1
32		Lamp Tube (Refer to "Lamp Tube Assembly" Elsewhere)	Ref.
33	040-0312-57	Screw	2
34		Serial Number Label	Ref.
35	061-0666-00	Type B Equipment Label	1

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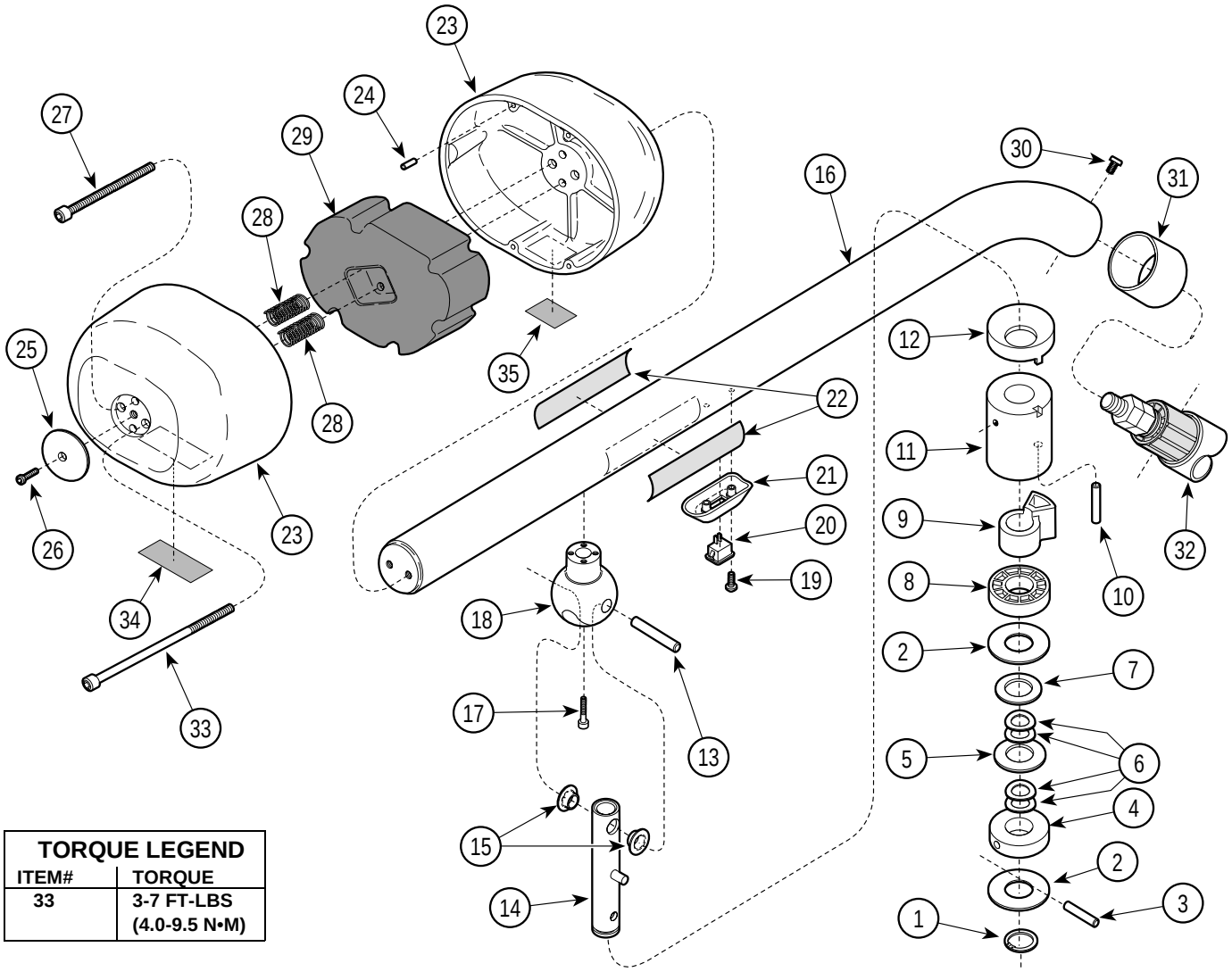
Cross Tube Assembly



TORQUE LEGEND	
ITEM#	**TORQUE**
33	**3-7 FT-LBS (4.0-9.5 N•M)**

MA550100

Used on units with Serial Numbers MV1060 thru Present

Item	Part No.	Description	Qty
	002-0617-00	Cross Tube Assembly (Includes Items 1 thru 22)	1
1	• 042-0101-05	• Retaining Ring	1
2	• 045-0001-111	• Washer	2
3	• 042-0157-01	• Groove Pin	1
4	• 057-0414-00	• Ball Pivot Cam	1
5	• 045-0001-112	• Washer	1
6	• 045-0001-110	• Wave Washer	4
7	• 016-0671-00	• DU Thrust Washer	1
8	• 053-0800-00	• Ball Pivot Bearing	1
9	• 002-0562-00	• Ball Pivot Stop Kit (Incl. item 3 & 15)	1
10	• 042-0157-00	• Groove Pin	1
11	• 057-0766-00	• Ball Pivot Housing	1
12	• 053-0798-00	• Ball Pivot Brake	1
13	• 042-0157-03	• Groove Pin ***(Not Reusable)***	1
14	• 030-1074-00	• Ball Pivot Shaft Weldment	1
15	• 016-0392-07	• DU Flange Bearing	2
16	• 002-0620-00	• Cross Tube Weldment Kit (Incl. 18)	1
17	• 118653	• Screw (Apply Loctite #042-0025-00)	4
18	•	• Ball Pivot (Part of Item 16)	1
19	• 040-0006-80	• Screw	2
20	• 015-1086-00	• Rocker Switch	1
21	• 053-0812-00	• Switch Bezel	1
22	• 061-0754-00	• Ritter 354 Model Label	2
	• 061-0732-00	• Midmark 354 Model Label	2
23	020-0168-00	Ballast Housing	2
24	042-0157-04	Groove Pin	4
25	053-0810-00	Housing Cap	1
26	040-0010-12	Screw	1
27	040-0250-144	Screw	1
28	525-0024-11	Spring	3
29	020-0169-00	Ballast	1
30	040-0010-131	Screw	2
31	053-0802-00	Common Pivot Sleeve	1
32		Lamp Tube (Refer to “Lamp Tube Assembly” Elsewhere)	Ref.
33	040-0312-57	Screw	2
34		Serial Number Label	Ref.
35	061-0666-00	Type B Equipment Label	1

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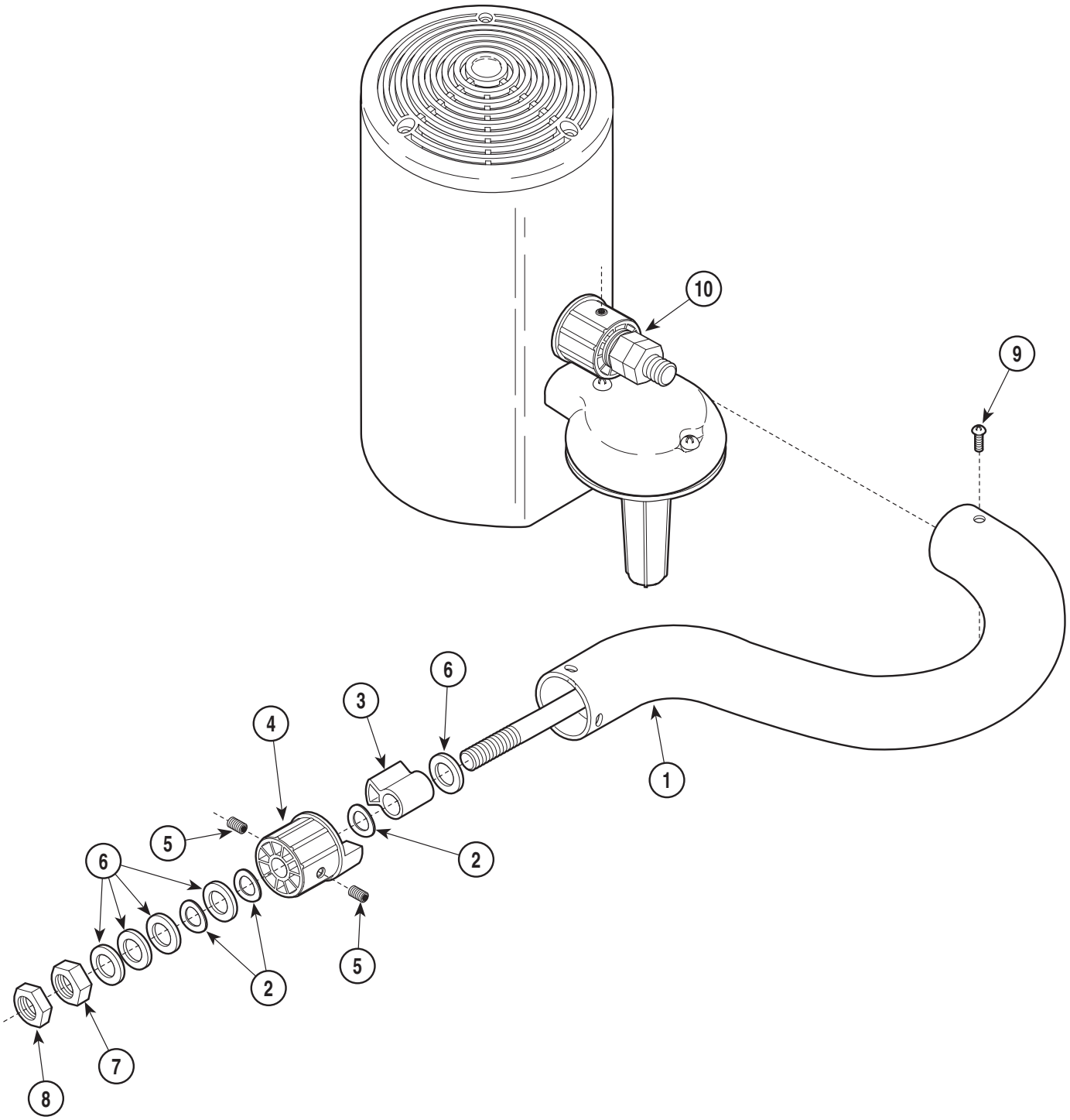
Lamp Tube Assembly



MA459901

Item	Part No.	Description	Qty.
	029-2162-00	Lamp Tube Assembly (Includes Items 1 thru 8)	1
1	• 030-1137-00	• Lamp Tube Weldment (Includes Groove Pin)	1
2	• 045-0001-109	• Wave Washer	3
3	• 053-0811-00	• Cross Pivot Stop	1
4	• 053-0801-01	• Common Pivot Bearing	1
5	• 042-0158-00	•Form-Lok Insert	2
6	• 045-0001-107	• Washer	5
7	• 041-0500-04	• Hex Nut	1
8	• 041-0500-09	• Nut	1
9	040-0010-124	Screw	2
10		Lighthead Assembly (Refer to "Lighthead Assembly" Elsewhere)	Ref

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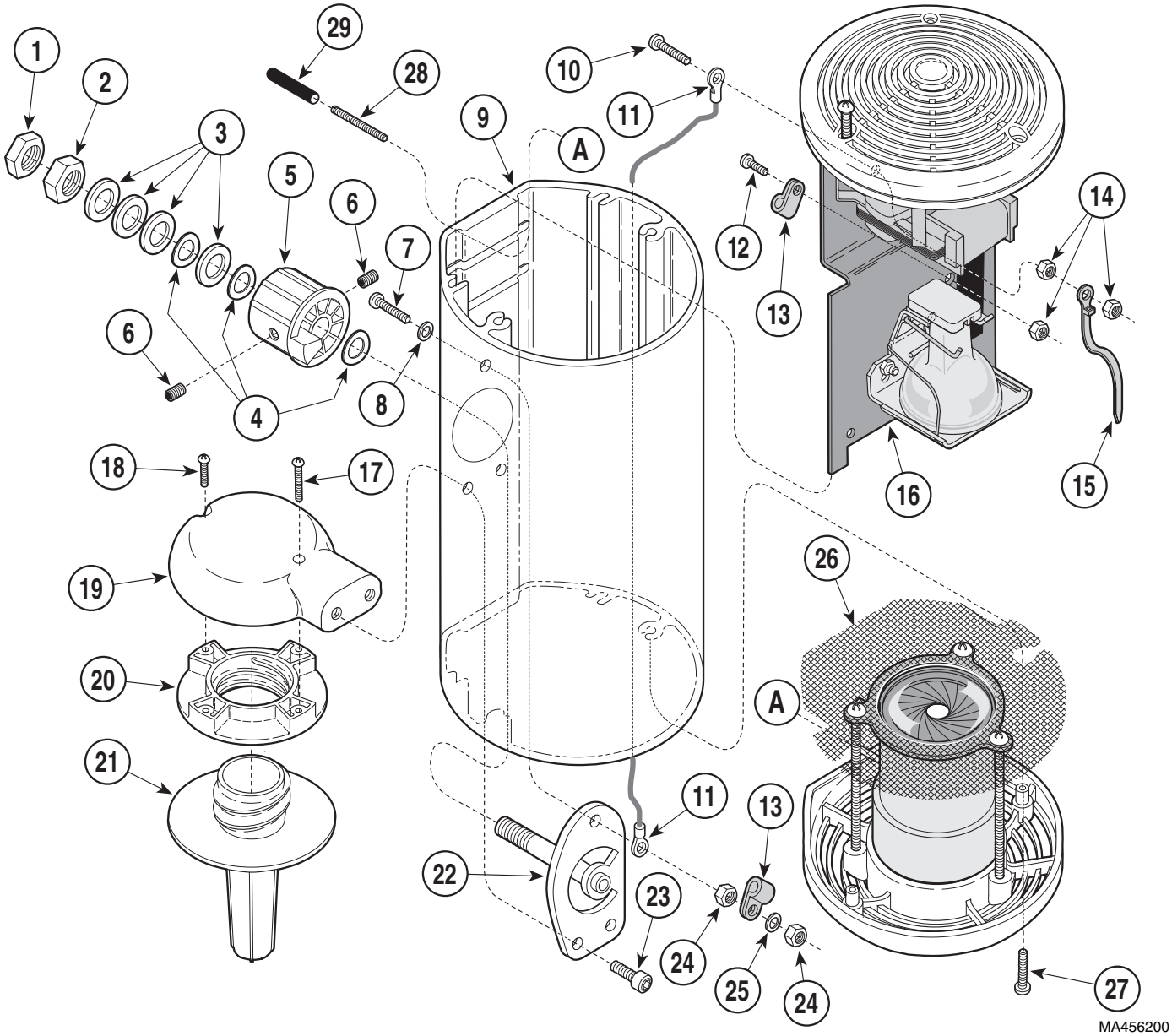
Lighthead Assembly



MA456200

Used on units with Serial Numbers KR1000 & MC1000 thru Present

Item	Part No.	Description	Qty.
	029-2159-00	Model 354 Lighthead Assembly (Includes Items 1 thru 27)	1
1	• 041-0500-09	• Nut	1
2	• 041-0500-04	• Hex Nut	1
3	• 045-0001-107	• Washer	4
4	• 045-0001-109	• Spring Washer	3
5	• 053-0801-01	• Common Pivot Bearing	1
6	• 042-0158-00	• Form-Lok Insert	2
7	• 040-0010-137	• Screw	1
8	• 045-0001-08	• Lockwasher	1
9	• 021-0029-00	• Outer Housing	1
10	• 040-0006-78	• Screw	1
11	• 016-0772-00	• Lanyard	1
12	• 040-0006-27	• Screw	1
13	• 015-0371-01	• Cable Clamp	2
14	• 041-0006-00	• Hex Nut	3
15	• 015-0017-00	• Cable Tie	1
16	•	• Bulb Carriage Assembly (Refer to “Bulb Carriage Assembly” Elsewhere)	Ref.
17	• 040-0006-89	• Screw	1
18	• 040-0006-88	• Screw	1
19	• 020-0187-00	• Handle Mount	1
20	• 053-0743-00	• Handle Adapter	1
21	• 053-0724-00	• Sterilizable Handle	1
22	• 030-1138-00	• Pivot Weldment	1
23	• 040-0010-90	• Screw	2
24	• 041-0010-00	• Hex Nut	2
25	• 045-0001-00	• Washer	1
26	•	• Optic Assembly (Refer to “Optic Assembly” Elsewhere)	Ref.
27	• 040-0006-55	• Screw	2
28	• 040-0004-20	• Slotted Set Screw	2
29	• 053-0268-03	• Vinyl End Cap	2

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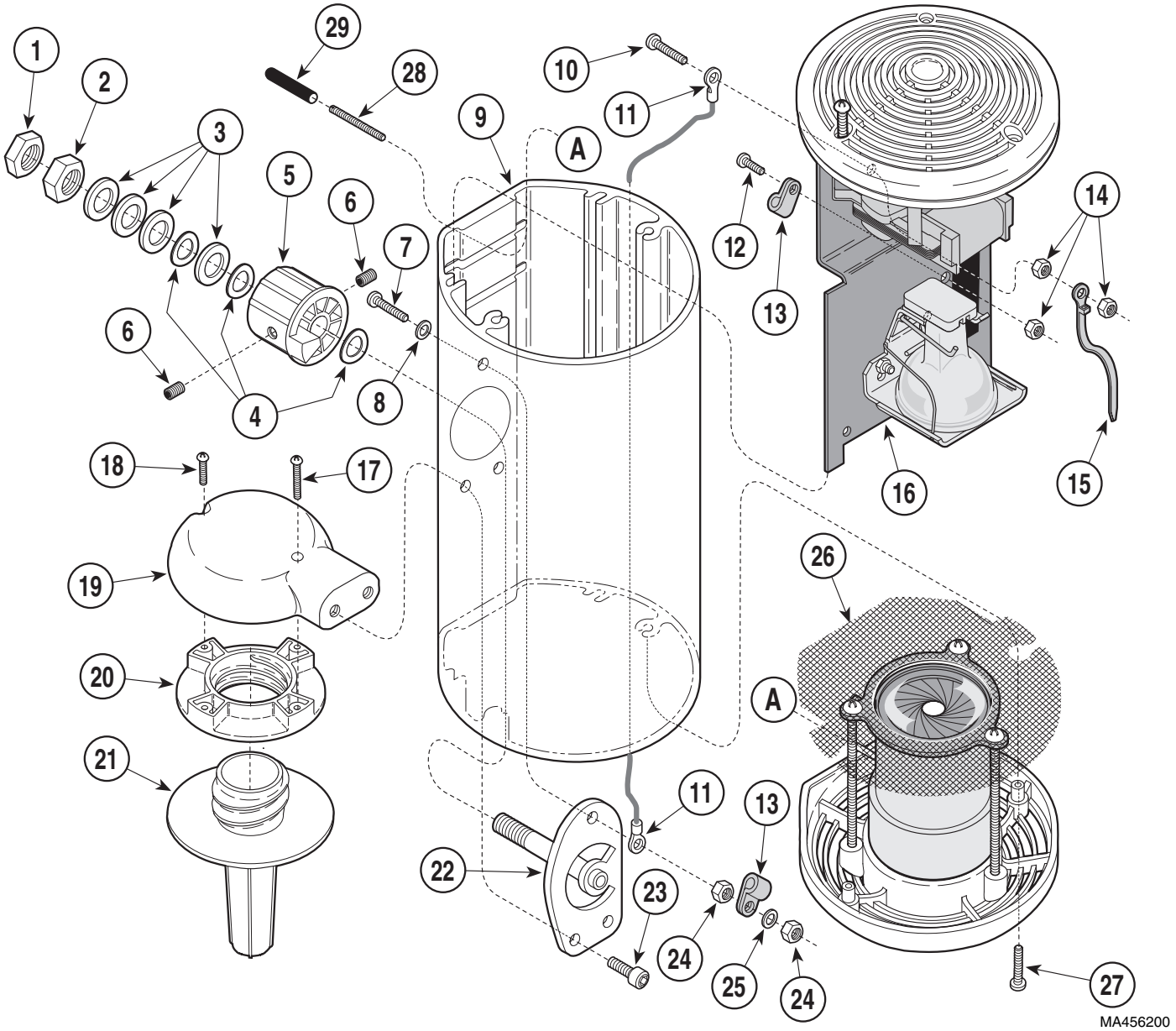
Lighthead Assembly



MA456200

Used on units with Serial Numbers MV1000 thru Present

Item	Part No.	Description	Qty.
	029-2395-00	Model 354 Lighthead Assembly (Includes Items 1 thru 27)	1
1	• 041-0500-09	• Nut	1
2	• 041-0500-04	• Hex Nut	1
3	• 045-0001-107	• Washer	4
4	• 045-0001-109	• Spring Washer	3
5	• 053-0801-01	• Common Pivot Bearing	1
6	• 042-0158-00	• Form-Lok Insert	2
7	• 040-0010-137	• Screw	1
8	• 045-0001-08	• Lockwasher	1
9	• 021-0029-00	• Outer Housing	1
10	• 040-0006-78	• Screw	1
11	• 016-0772-00	• Lanyard	1
12	• 040-0006-27	• Screw	1
13	• 015-0371-01	• Cable Clamp	2
14	• 041-0006-00	• Hex Nut	3
15	• 015-0017-00	• Cable Tie	1
16	•	• Bulb Carriage Assembly (Refer to “Bulb Carriage Assembly” Elsewhere)	Ref.
17	• 040-0006-89	• Screw	1
18	• 040-0006-88	• Screw	1
19	• 020-0187-00	• Handle Mount	1
20	• 053-0743-00	• Handle Adapter	1
21	• 053-0724-00	• Sterilizable Handle	1
22	• 030-1138-00	• Pivot Weldment	1
23	• 040-0010-90	• Screw	2
24	• 041-0010-00	• Hex Nut	2
25	• 045-0001-00	• Washer	1
26	•	• Optic Assembly (Refer to “Optic Assembly” Elsewhere)	Ref.
27	• 040-0006-55	• Screw	2
28	• 040-0004-20	• Slotted Set Screw	2
29	• 053-0268-03	• Vinyl End Cap	2

Always Specify Model & Serial Number

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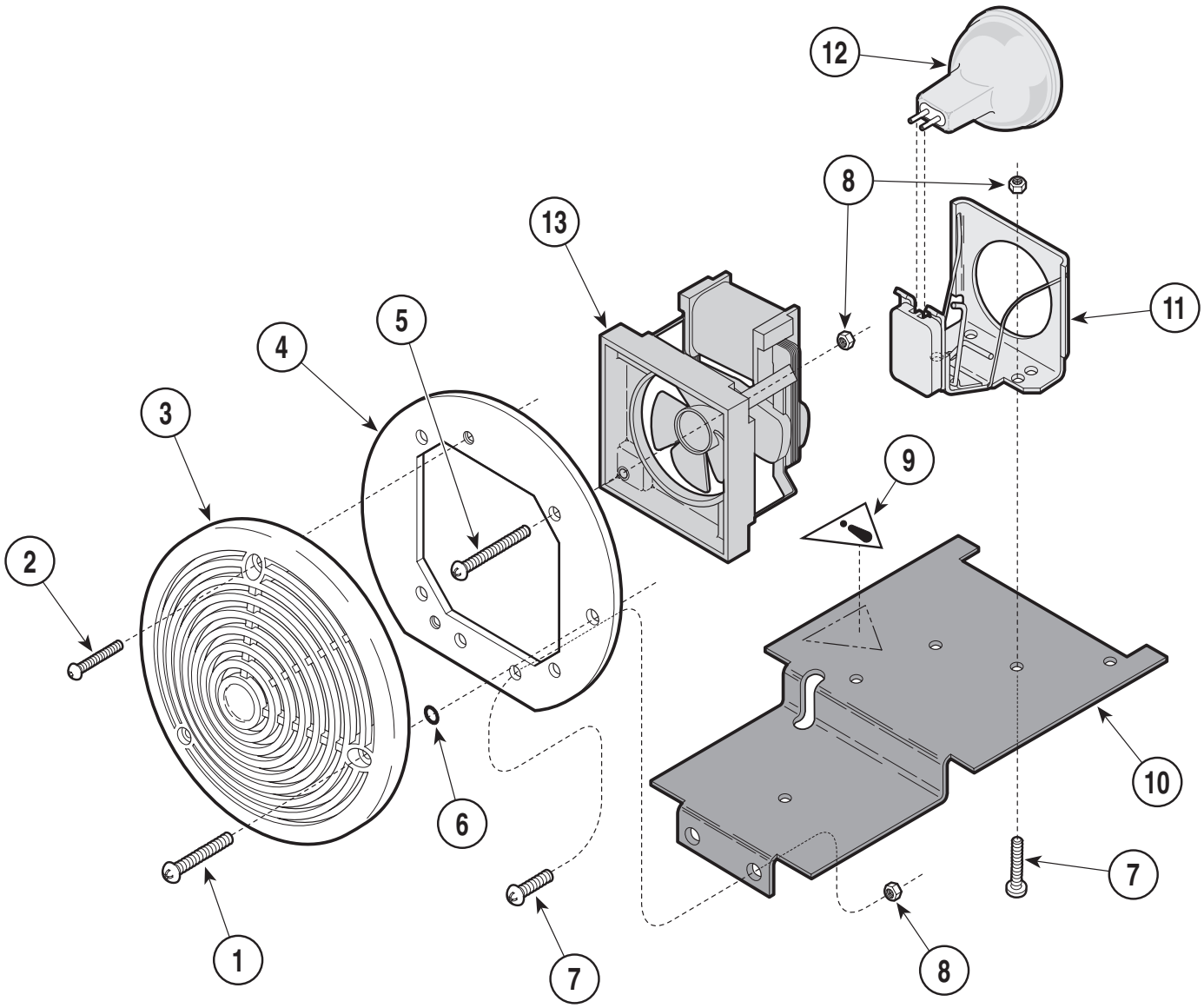
Bulb Carriage Assembly



MA550000

Item	Part No.	Description	Qty.
	029-2165-00	Bulb Carriage Assembly (Includes Items 1 thru 13)	1
1	• 040-0008-31	• Screw	1
2	• 040-0006-86	• Screw	2
3	• 053-0925-00	• Top Cap	1
4	• 050-4024-00	• Adapter Plate	1
5	• 040-0006-42	• Screw	4
6	• 014-0176-36	• O-Ring	1
7	• 040-0006-27	• Screw	4
8	• 041-0006-00	• Hex Nut	8
9	• 061-0654-00	• Caution Label	1
10	• 050-4023-00	• Base Mount	1
11	• 015-0921-00	• Lamp Holder with Socket	1
12	• 002-0605-00	• Lamp Replacement Kit	1
13	• 015-1213-00	• Fan (20 VAC)	1

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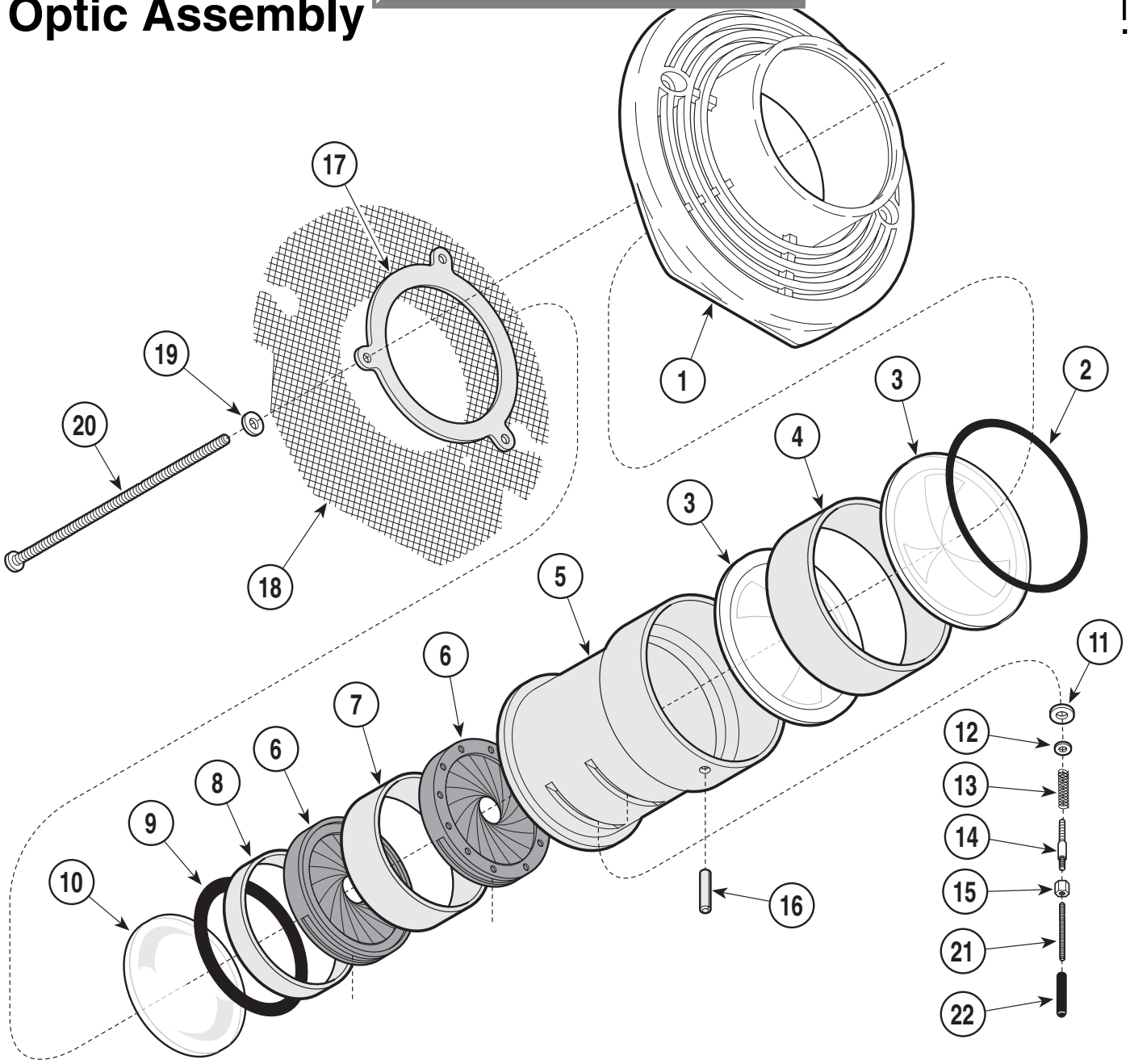
Optic Assembly



MA456000

Used on units with Serial Numbers KR1000 & MC1000 thru Present

Item	Part No.	Description	Qty.
	029-2187-00	Optic Assembly (Includes Items 1 thru 20)	1
1	• 053-0949-00	• Front Cover	1
2	• 014-0176-39	• O-Ring	1
3	• 053-0942-00	• Lens	2
4	• 052-0307-00	• Lens Spacer	1
5	• 052-0309-00	• Optic Housing	1
6	• 016-0751-00	• 50 MM Iris Diaphragm (Apply Graphite Lubricant Spray #064-0020-00)	2
7	• 052-0308-00	• Iris Spacer	1
8	• 052-0321-00	• Cover Spacer	1
9	• 014-0176-38	• O-Ring	1
10	• 053-0956-00	• Cover Glass	1
11	• 045-0001-93	• Washer	2
12	• 045-0001-120	• Washer	2
13	• 525-0024-14	• Spring	2
14	• 057-0505-00	• Iris Lever Shank	2
15	• 041-0036-00	• Coupling Hex Nut	2
16	• 505-703705	• Roll Pin	1
17	• 050-4025-00	• Retaining Disk	1
18	• 016-0753-00	• Screen	1
19	• 045-0001-21	• Washer	3
20	• 040-0006-87	• Screw	3
21		Set Screw (Refer to “Lighthead Assembly” Elsewhere)	Ref.
22		Vinyl End Cap (Refer to “Lighthead Assembly” Elsewhere)	Ref.

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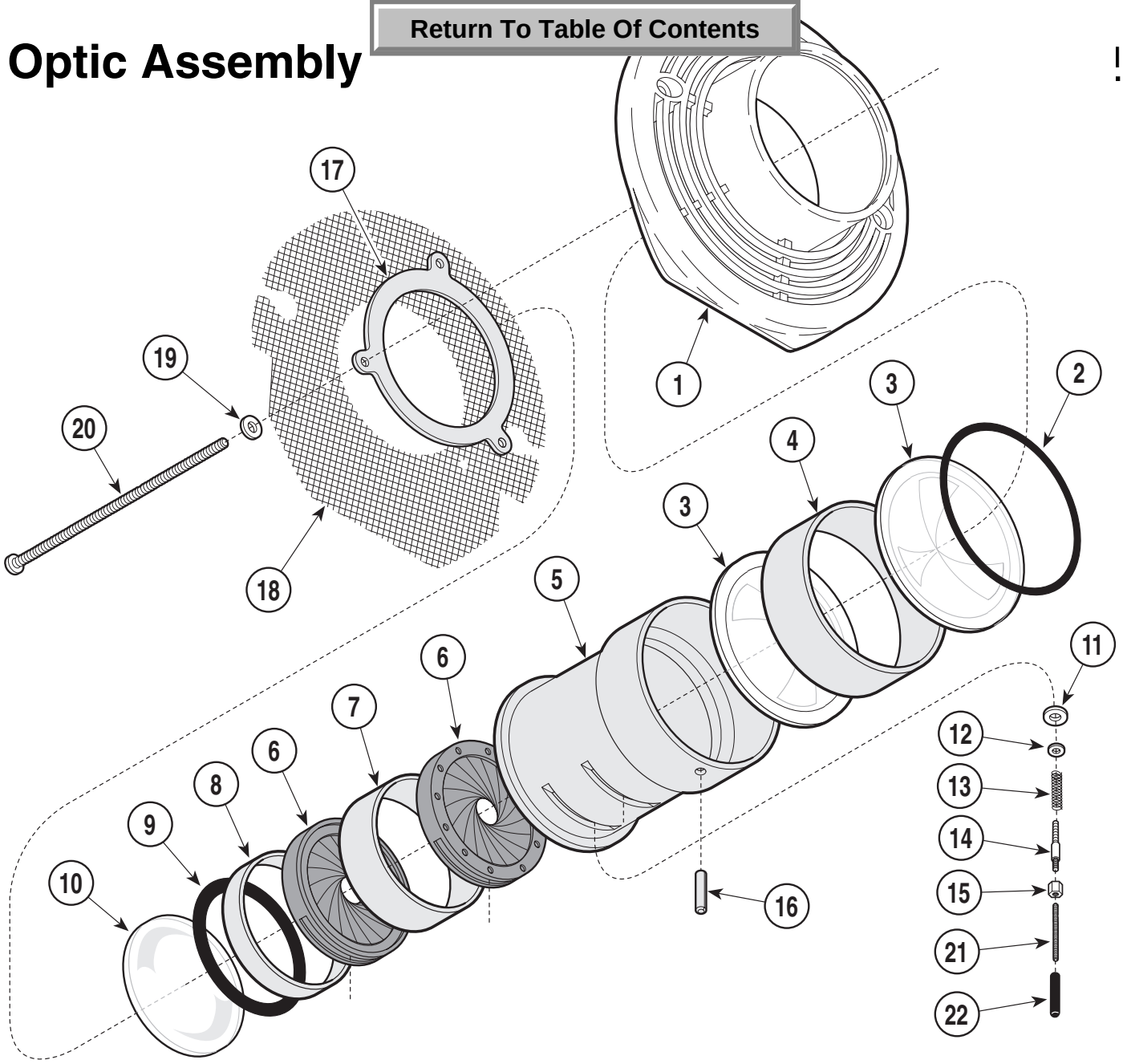
Optic Assembly



MA456000

Used on units with Serial Numbers MV1000 thru Present

Item	Part No.	Description	Qty.
	029-2394-00	Optic Assembly (Includes Items 1 thru 20)	1
1	• 053-0949-00	• Front Cover	1
2	• 014-0176-39	• O-Ring	1
3	• 053-0942-00	• Lens	2
4	• 052-0307-00	• Lens Spacer	1
5	• 052-0309-00	• Optic Housing	1
6	• 016-0751-00	• 50 MM Iris Diaphragm (Apply Graphite Lubricant Spray #064-0020-00)	2
7	• 052-0308-00	• Iris Spacer	1
8	• 052-0321-00	• Cover Spacer	1
9	• 014-0176-38	• O-Ring	1
10	• 053-1045-00	• Cover Glass - Color Corrected	1
11	• 045-0001-93	• Washer	2
12	• 045-0001-120	• Washer	2
13	• 525-0024-14	• Spring	2
14	• 057-0505-00	• Iris Lever Shank	2
15	• 041-0036-00	• Coupling Hex Nut	2
16	• 505-703705	• Roll Pin	1
17	• 050-4025-00	• Retaining Disk	1
18	• 016-0753-00	• Screen	1
19	• 045-0001-21	• Washer	3
20	• 040-0006-87	• Screw	3
21		Set Screw (Refer to “Lighthead Assembly” Elsewhere)	Ref.
22		Vinyl End Cap (Refer to “Lighthead Assembly” Elsewhere)	Ref.

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SECTION VI
PARTS LIST

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Return To Table Of Contents

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Return To Table Of Contents

FAX ORDERING FORM

(SERVICE PARTS ONLY)

NOTES:

- **ALL BLOCKED AREAS MUST BE COMPLETED.**
- **USE FOR NON-WARRANTY FAX ORDERS ONLY. WARRANTY ORDERS MUST BE TELEPHONED IN (1-800-MIDMARK).**

ATTENTION: SERVICE DEPARTMENT FAX#: 877-249-1793

ACCT #: _____ **P.O. #:** _____ **DATE:** _____

NAME: _____ **SHIP TO:** _____

ADDRESS: _____

CITY, ST.: _____

CONTACT: _____

PHONE: _____

☐ **NON-EMERGENCY ORDER - TO SHIP WITHIN 72 HOURS IF PART(S) IN STOCK.**

☐ **EMERGENCY ORDER - TO SHIP WITHIN 24 HOURS IF PART(S) IN STOCK (IF ORDER IS RECEIVED BEFORE 1:30 P.M. E.S.T).**

SEND NOTIFICATION IF PARTS ARE NOT AVAILABLE TO SHIP WITHIN 24 HOURS VIA E-MAIL OR FAX TO: _____

METHOD OF SHIPMENT **OTHER** _____

UPS	FED EX
☐ NEXT DAY A.M.	☐ NEXT DAY A.M.
☐ NEXT DAY P.M.	☐ NEXT DAY P.M.
☐ 2ND DAY	☐ 2ND DAY
☐ GROUND	☐ ECONOMY

QTY.	PART #	DESCRIPTION (SPECIFY COLOR OF ITEM IF APPLICABLE)	COLOR CODE	PRICE/PER

Return To Table Of Contents

Return To Table Of Contents

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60 Vista Drive
P.O. Box 286
Versailles, Ohio 45380-0286
937-526-3662
Fax 937-526-5542
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